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MOTOR AGE

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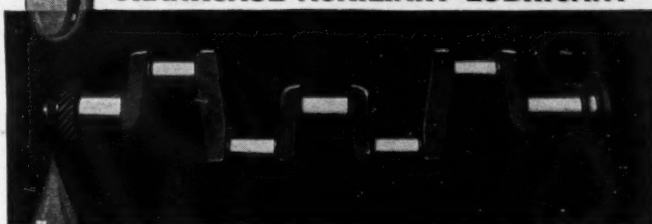
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April, 1936

FOR THE
"Changeover,"
OILDAG*

ASSURES EXTRA PROTECTION
WHEN USED AS A -

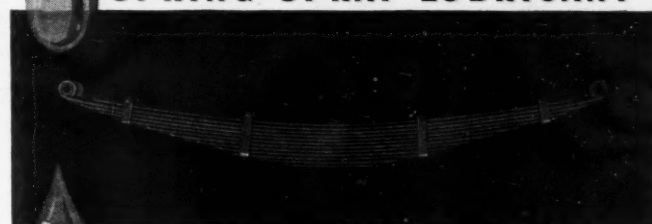
CRANKCASE AUXILIARY LUBRICANT



TOP CYLINDER LUBRICANT



SPRING SPRAY LUBRICANT



A wide choice of excellent auxiliary lubricants containing "Oildag"® Brand colloidal graphite (in oil) is available to automotive dealers, jobbers and wholesalers.

The use of these products is invaluable for protection of new and used cars alike. The graphoid surface formed on the friction parts easily withstands the temperatures existing in the combustion zone of an engine, thus safeguarding against metal-to-metal contact when momentary oil film rupture occurs.

Spring spray oils are especially efficient when charged with Acheson's colloidal graphite. The fine particles of graphite readily penetrate between the springs giving a pressure resisting solid lubricant that not only cuts squeaks to a minimum but lasts longer.

Send for Booklet AF

*Reg. U. S. Pat. Off.



ACHESON
COLLOIDS CORPORATION
FOUNDED [1908] AS ACHESON OILDAG COMPANY
PORT HURON • MICHIGAN

TWICE IN 1 YEAR

COIL PROFITS JUMP

—thanks to American-Bosch



THE AMERICAN-BOSCH "Two-for-All" COIL PLAN

Until a few months ago to serve all requirements, you would have had to stock over 60 lock coils or more. Impossible! Now American-Bosch introduces 2 coils that take the place of 60; and serve 90% of the cars on the road. These two coils are packed in the attractive display kit illustrated at left. It contains 1 standard type American-Bosch Safety Coil, 1 High-Speed American-Bosch Safety Coil, 2 Mounting Brackets, 4 Fittings. Also 1 Emergency Cap which transforms Safety Coils, in emergency cases, into non-lock coils. Dealer cost only \$5.75. (West of Rockies, \$6.40. Canada, \$8.00.)

JUST 10 years ago...in April 1926... American-Bosch introduced a "Universal Coil," biggest boon to coil profits the industry had ever known. Ever since, thousands of dealers have featured American-Bosch Coils...and have been the first to profit from new American-Bosch developments! The two newest:

July, 1935...American-Bosch revolutionized the entire coil business by introducing the Two-for-All Coil Plan described above.

March, 1936...American-Bosch scored again with three new coils at new low prices. Two of them additions to the line: high speed coils identical in performance with coils 50¢ to 75¢ higher in cost. The third, a new Big Brute Coil for heavy duty service; priced \$1.25 lower, yet actually snappier and more powerful.

American-Bosch Electro-Balanced Coils are *first in quality*...as dependable as American-Bosch Magnetos. *First in performance*...electro-balanced, for perfect teamwork in the ignition system. *First in profits*...constant new basic ideas in coils and coil merchandising make American-Bosch the most progressive, most profitable coil line for you!

UNITED AMERICAN BOSCH CORP.
SPRINGFIELD, MASS. New York Chicago Detroit

A New HIGH-SPEED COIL at a New Low Price

Type TC 69U for 6 Volt Systems—List Price . . . **\$3.75***



A New HIGH-SPEED COIL at a New Low Price

Type TC 129U for 12 Volt Systems—List Price **\$4.50***



A New BIG BRUTE COIL at a New Low Price

6 Volt, Type TC 606; 12 Volt, Type TC 612—List Price **\$6.25***



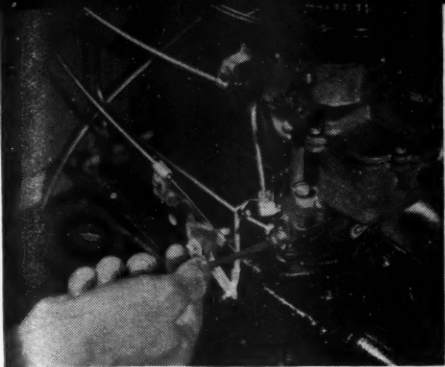
*Western and Canadian prices slightly higher

The makers of American-Bosch products have always taken pride in creating, designing, building and selling products superior to those commonly in use. Built to a high standard of quality, these products are proven leaders in their fields.



AMERICAN-BOSCH

ELECTRO-BALANCED COILS



Springtime is Tune-Up Time

Here's an Eight Point Maintenance Program to Help You Cultivate Early Spring Profits

By Bill Toboldt

IN spring, people's fancy turns to thoughts of love, baseball, golf, fishing, camping, and vacations in general. In all of these activities the automobile plays an important part, and whether the car has been laid up for the cold weather or if it has been traveling over the snow rutted roads of winter, it needs a complete spring tune-up—at least.

With the car owner automobile minded and the car needing service, sales resistance for spring service is reduced to as low a point as it will get, and it's up to the service stations to capitalize on the situ-

ation. Spring is not only the logical season to sell the car owner, because he is in the mood for improvements, but also because the car requires considerable service. The result is that one-third of the entire year's maintenance is sold in April, May and June.

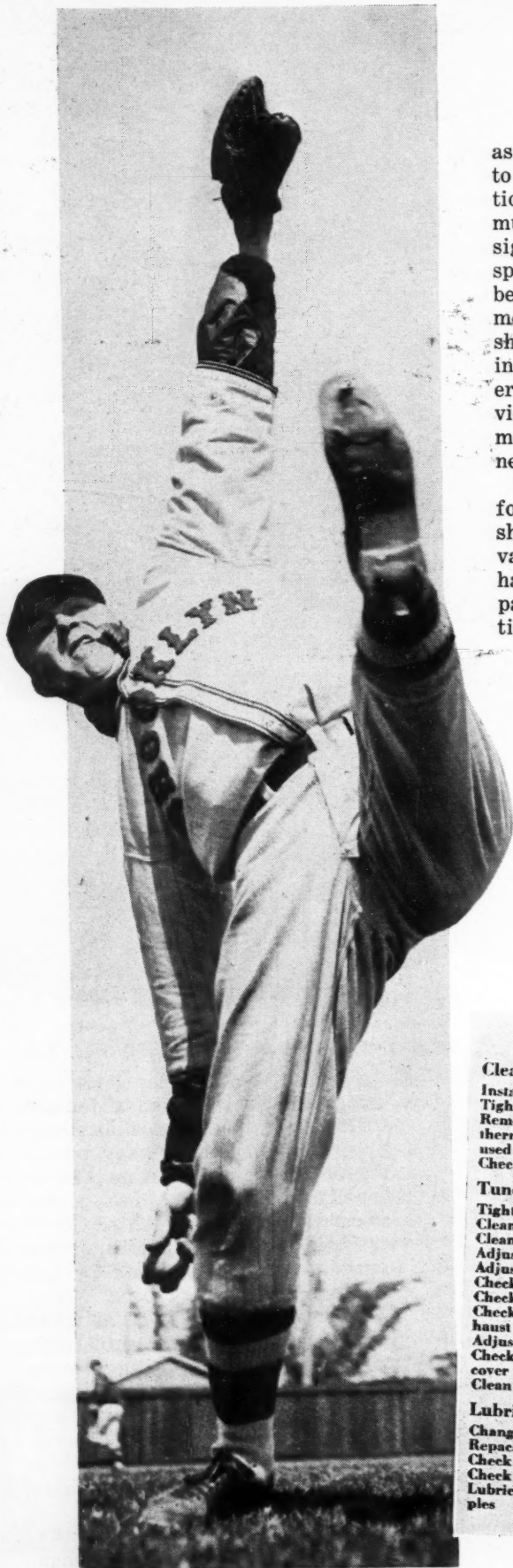
The best way of cashing in on this spring maintenance business is to have a complete spring tune-up program. As a suggestion, an eight-point program is listed, and this can be priced and sold as a complete job or each point can be sold separately, depending on the desires of the car

owner and the condition of the car.

Of course, having a definite sales program always has many advantages, but this year there is an especial advantage, since jobber salesmen all over the United States are being urged to tune-in on this same eight-point program by Lee Banigan, editor of **MOTOR WORLD WHOLESALE**, and they will be ready to cooperate in every way possible to make this spring selling season the best you have ever known.

However, in putting over the spring tune-up service idea, the entire program must be planned in its entirety. It is not enough to simply list those jobs which are logical to sell at a certain season and then try to sell those jobs when,

Springtime is Tune-Up Time



as and if a customer happens to wander into the service station. But the service station must be cleaned and painted; signs and banners selling spring tune-up service should be placed in conspicuous places; men contacting customers should be instructed in the selling program; and the car owner should be drawn to the service station by means of direct mail advertising, hand bills, or newspaper advertising.

In such advertising, the need for spring tune-up service should be explained; the advantages to the car owner of having the work done at this particular time and at your particular service station should be pointed out and the prices for the various tune-up jobs listed for popular makes of cars or for that particular owner's car. In this connection many service shops have written to MOTOR AGE for copies of letters designed to bring in additional customers for spring tune-up jobs. If you want copies of such letters, write immediately,

and the copies will be sent by return mail.

Turning now to the jobs on which the spring service campaign is to be built, we find that there are eight jobs which should logically receive special attention at this particular season. These jobs are listed with this article. The main feature of these jobs is that, in addition to taking care of the average car's needs, these operations will permit a careful check of the entire car and in that way much additional work will be discovered. In other words, it is not sufficient to simply do the work outlined. The mechanic should follow through and check and double check the entire car, noting those units and adjustments that should be done, in addition to the work outlined, in order to improve the performance, appearance, comfort, and safety of the car. Such additional work should then be pointed out to the customer and the prices quoted.

Special equipment is, of course, of considerable value, not only in doing these jobs,

(Continued on page 86)

Spring Tune-Up Operations

Clean cooling system, includes

- Install new hose connections
- Tighten fan belt
- Remove heater connections, and change thermostat if special winter thermostat was used
- Check water pump

Tune engine, includes

- Tighten cylinder head
- Clean and adjust breaker points
- Clean and adjust spark plugs
- Adjust valve tappets
- Adjust carburetor
- Check ignition timing
- Check compression
- Check muffler for back pressure and exhaust leaks
- Adjust timing chain
- Check cylinder head, manifold and valve cover gaskets
- Clean fuel lines and filters and carburetor

Lubricate car

- Change to summer lubricants
- Repack spring covers
- Check shock absorbers
- Check oil filter
- Lubricate all fittings, replacing missing nipples

Check electrical system, includes

- Adjust generator charging rate
- Clean generator and starter commutator
- Install new brushes
- Check battery and battery cables
- Check all wiring
- Check and adjust headlights

Adjust brakes, includes

- Check thickness of lining
- Check surface of drums

Check alignment of front wheels, includes

- Caster
- Camber
- Toe-in
- Adjust steering gear
- Check for sagging or broken springs—tighten spring clips
- Check condition of tires

Tighten body bolts and remove rattles and squeaks, includes

- Door alignment
- Door bumpers
- Tighten spring clips and shackles
- Remove dents, touch-up rust spots, dress top

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R AGE



Ewing Galloway

Car owners will spend money this spring on tune-up. They need their cars for baseball, swimming, fishing, boating, racing and other sports. Tune-in on Spring Tune-up

April, 1936

Profit-making Tools and Equipment

Accelerometers	Gages, Brake
Ammeters	Drum
Analizers,	Gages, Brake
Combustion	Shoe
Analizers	Gages, Crank Pin
(Engine and	Gages, Cylinder
Electrical)	Gages, Cylinder
Bars, Grease	Compression
Rack	Gages, Dial
Bars,	Gages, Engine
Straightening	Vacuum
Bars, Towing	Gages, Muffler
Bins, Parts	Back Pressure
Blades, Saw	Gages, Piston Pin
(Hack)	Gages, Thickness
Blocks or Hoists,	or Feeler
Chain	Gages, Tire
Booths, Spraying	Pressure
Boxes, Tool	Gages, Wheel
Brushes, Carbon	Aligning
Removing	Hammers
Calipers and	Heaters, Piston
Dividers	Hoists
Cans, Radiator	Hones, Cylinder
Filling	Hones, Piston
Carriers, Storage	Pin
Battery	Hooks, Car
Chains, Block	Lifting
Chargers, Battery	Horses and
Clamps, Brake	Trestles
Lining	Hose, Air
Clamps, Hand	Hydrometers
Screw	Instruments,
Cleaners, Engine	Battery Testing
Cleaners, Spark	Irons, Soldering
Plug	Jacks, Body
Cleaners,	Workers'
Vacuum	Jacks, Car Lifting
Clippers, Bolt	Jacks, Spring
Commutator	Jigs, Connecting
Undercutters	Rod Aligning
Compressors, Air	Jigs, Bearing
Connectors, Ter-	Babbiting
minial, Battery	Kits, Tool
Charging	Lamps, Trouble
Countersinks	Lathes
Cranes, Truck	Lathes, Flywheel
Creepers, Repair	Lifts, Auto
Cutters, Piston	Lubricators,
Chamfer	Hand
Cutters, Washer	Lubricators,
and Gasket	High Pressure
Depressors, Brake	Lubricators,
Pedal	Spring Leaf
Dies and Screw	Machines, Balanc-
Plates	ing (Wheel)
Disks, Abrasive	Machines, Brake
Dispensers, Oil	Lining
Dollies, Axle	Resurfacing
Drills, Breast	Machines, Brake
Drills, Electric	Relining
Drills, Twist	Machines,
Drivers, Bushing	Clutch
Drivers, Screw	Rebuilding
Dynamometers	Machines,
Extinguishers,	Commutator
Fire	Turning
Extractors, Bolt	Machines,
and Screw	Cylinder
Extractors,	Reboring
Bushing	Machines,
Files, Contact	Degreasing
Point	Machines,
Files, Piston Ring	Drilling
Files and Rasps	Machines, Glass
Fillers, Storage	Beveling
Battery	Machines,
Flushers, Radi-	Grinding
ator and Block	(Brake Drum)
Frames, Hack	Machines,
Saw	Brake Drum
Funnels, Metal	Reconditioning
Furnaces,	Machines,
Soldering	Grinding
	(Crank Pin)



Profits Come To The

THE day is long past—if it ever existed—when a man could go into the automobile repair business with a kit of tools and a lot of ambition and make any important money.

To succeed today equipment is needed—for profits come to the well-equipped shop.

Modern equipment has a two-fold purpose. First it enables the shop to do a better job in less time, which results in greater profits. Second, it is a potent business-getter—attracting customers to the shop and assuring them the work will be performed with precision and accuracy, resulting in improved



Well-Equipped Shop

performance, increased economy, greater comfort and a higher degree of safety.

The tools and equipment found in the accompanying lists have been found necessary and profitable by many shops throughout the country and while no single station would find it advisable to have all

of the items listed, the list will serve as a reminder of the various units that are available to help increase your profits. Check this list carefully against your present inventory of equipment and see how you stand.

Profits come to the well-equipped shop.

Profit-making Tools and Equipment

Machines, Grinding (Cylinder)	Testers, Spark Plug
Machines, Grinding Brake Cylinder	Testers, Spring
Machines, Grinding (Valve Seat)	Testers, Valve Seat
Machines, Piston Pin	Tools, Body and Fender Repair
Hole Boring	Tools, Clutch Alignment
Machines, Piston Refinishing	Tools, Crank Pin Truing
Machines, Tire Inspecting	Tools, Cylinder Ridge Cutting
Machines, Tire Removing and Replacing	Tools, Piston Fitting
Micrometers	Tools, Piston Grooving
Motors, Electric	Tools, Piston Pin Lock Ring Grooving
Pans, Drip	Tools, Piston Ring Compressing
Pliers	Tools, Piston Ring Groove Cleaning
Pliers, Tire Chain	Tools, Piston Ring Removing and Installing
Polishers, Body	Tools, Piston Skirt Expanding
Presses, Straightening (Wheel)	Tools, Rim Contracting
Pullers, Axle	Tools, Spring Shackle
Pullers, Bearing	Tools, Spring Spreading
Pullers, Gear and Wheel	Tools, Storage Battery Repair
Pumps, Oil	Tools, Striping
Pumps, Gasoline	Tools, Thread Restoring
Pumps, Tire	Tools, Tire
Punches, Center	Tools, Tire Chain Repair
Racks, Service	Tools, Valve Grinding
Reamers	Tools, Valve Guide Cleaning
Reamers, Bearing	Tools, Valve Guide Installing
Reclaimers, Crankcase Oil	Tools, Valve Key Inserting
Refacers, Valve	Tools, Valve Lifting
Refillers, Brake Cylinder	Tools, Valve Seat Refinishing
Regroovers, Tire	Tools, Valve Seat Renewing
Scrapers, Bearing	Torches and Furnaces
Sets, Rivet	Trucks, Wrecking
Sears and Snips	Turntables, Automobile
Sprayers, Metal	Vises, Machinists'
Sprayers, Paint, Varnish and Lacquer	Vises, Piston
Stands and Towers, Air and Water	Voltmeter
Stones, Contact Point Cleaning	Vulcanizers
Straighteners, Axle and Frame	Automobile Washers, Automobile (Brushes)
Stretchers, Brake Lining	Welders and Equipment
Synchronizers, Ignition	Wheels, Buffing and Polishing
Tanks, Inner Tube Testing	Wheels, Grinding
Tanks, Oil	Winches, Truck
Tanks and Systems, Gasoline and Oil Storage	Wrenches, all types
Taps	
Testers, Brake	
Testers, Electrical	
Testers, Engine	
Testers, Fuel Pump	
Testers, Gasoline Mileage	
Testers, Headlight	



How To Make a Spring Clean-Up

**Which Means a Shop Clean-up
That Produces a Cash Clean-up
For You**



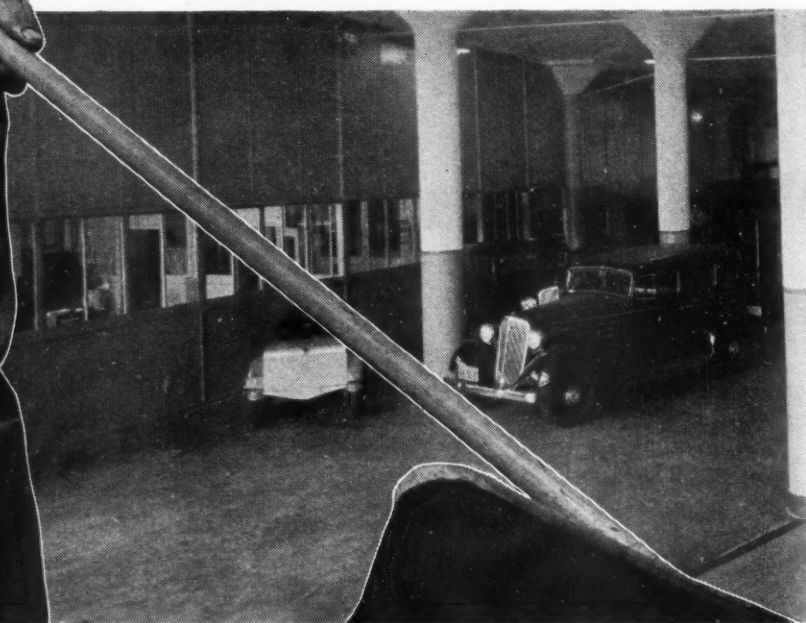
WITH the spring thaw of maintenance dollars, millions will be spent by motorists on the Appearance, Performance, Comfort and Safety of their automobiles.

One way to go after this business is to make your place sufficiently attractive as to invite business to come to you! And to come again, and again, as often as the need arises.

Shop appearance is such an essential thing in selling service. Many times it represents the difference between profit and loss, success and failure.

People judge you, as a serviceman, by the shop you keep. They are attracted by the efficiency of your men and your equipment, by the cleanliness and orderliness of your shop.

Here's a four-point plan to help you make a clean-up this spring. First of all, improving the appearance of both the inside and outside of your shop. Second, locating and displaying shop equipment. Third, merchandising parts and accessories through proper display. Fourth, using to advantage signs, sales help and other aids offered by jobbers and manufacturers.



By Frank P. Tighe

The exterior of your shop is the point of contact with maintenance buyers (where the prospect gets his first impression of you)!

It isn't necessary that it be a show-place of the countryside—but does your shop attract business? Would paint, repairs, window cleaning, improvements in architectural design help you make a spring *cash* clean-up?

Is your place properly identified? Signs, floodlights, displays of accessories, tires and batteries will bring passing motorists nearer to you. White curbs and ramps make it easier to drive in for service. Equipment displayed out front is display advertising that costs you nothing.

Would you like to have a salesman work for you without pay? One who will shout to every motorist within "sound of his voice?" Have him say, for example, "Springtime is Tune-up Time. Have Your Car Lubricated, Washed, Polished, Engine Tuned, etc." That's what an attractive, well-located sign is—a salesman working without pay.

Accessory and parts displays, window trims, clean uniforms, signs and sales helps—all of these come under appearance, for they help you put your best foot forward.

Follow MOTOR AGE from month to month for profitable selling ideas. Write us if you have a par-

ticular problem—MOTOR AGE can and will be glad to help you.

When your jobber's salesman drops in, get his advice on improving the appearance of your place—he has a wealth of ideas, he knows conditions in your neighborhood and he can give you an outsider's viewpoint—a helpful and constructive one, too.

Now, when the customer steps inside your shop—does he want to turn around and go out again? Or, does the equipment you display make him say to himself—"This guy must know his business."

Believe it or not, the buyer takes in everything. The condition of the floors, walls and ceiling. Painted floors are, to him, greaseless floors. Floor markings, like traffic lanes, help bring his business to you.

Another important point is to take full advantage of the sales appeal that is built in modern shop equipment. Equipment manufacturers not only consider the practical purpose of the machinery they make, but also build it to help merchandise and sell the service it performs.

Canopies and special lighting add color and sales appeal to the repair shop.





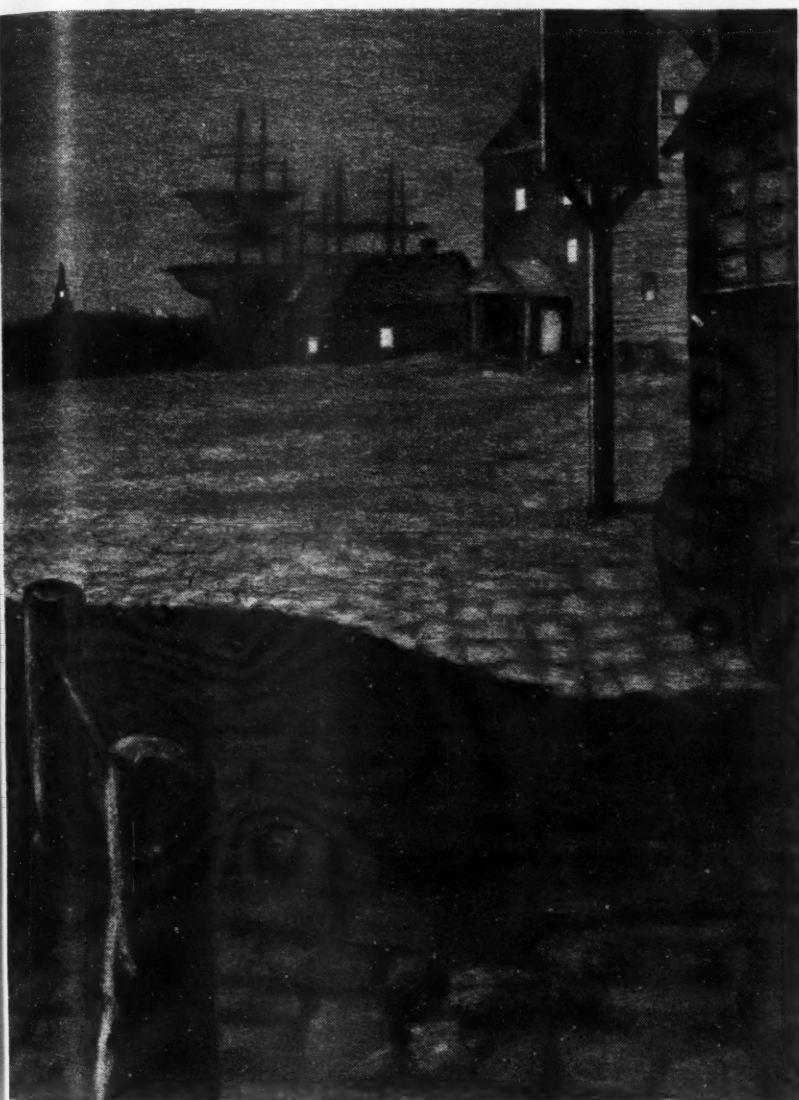
Wanted: An Army

WE hear a lot of talk today to the effect that the country is being pushed toward Communism, Fascism, Socialism or something made up of parts of all of them. Some of us think that there is a great deal going on which rightly makes us feel that this is so, which makes us believe that if we don't do what we can do to get back to the fundamental principles of Americanism as soon as possible and realize again that, after all, those fundamentals are what made

this country great, we shall have a collectivistic millstone around our national neck before we know it and whether we like it or not.

Why do we think so? Well, it isn't, as a well-known newspaper commentator said, because the folks in Washington are using uncomplicated language to describe anyone and all those who have been successful in a material way, who have built up some big businesses for themselves and for others and who have accumulated enough money

so that they can buy two or three automobiles if they want them. It isn't, as this fellow said, because Mr. Roosevelt and his New Dealers say that they are going to soak the rich or because they call the bankers and Liberty Leaguers and everyone else who isn't friendly to their ideas, by whatever bad names they can think of. The Communists talk that way, this newspaper man said, so that's why we say that the New Deal has Communistic tendencies. That's silly. It isn't that at all.



By Julian Chase

the national government, takes Individual Liberty by the neck and makes it say uncle. If the Authoritarian State idea gets pushed along much farther by our lawmakers and the man who tells our lawmakers what to do and what not to do, there will be no such thing as State Rights or individual freedom for men who think they have the right to speak their minds or for men who want to give up farming or something else and go into the automobile repairing business, for men who want to run their own business in their own way and be somebody on their own account.

We can't be mistaken about this. Here's what Mr. Roosevelt himself said about it in a speech while he was using the rostrum in the Capitol for a soapbox. He put it this way:

"In 34 months we have set up new instruments of public power in the hands of the people's government, which power is wholesome and appropriate, but in the hands of political puppets of an economic autocracy such power would provide shackles for the liberties of our people."

Now that means, if it means anything at all, that Mr. Roosevelt himself feels that the power built up through the laws passed by his dutiful Congress would be unsafe in the hands of someone else who some day is sure to be President. If we have any sense at all, we don't want laws like that. Even

(Continued on page 96)

of Paul Reveres!

ONE thing that makes us afraid that, as we are now going and have been going since 1933, we are headed toward an Authoritarian State is the way that they are trying to center control over everything in Washington—farming, manufacturing, shipping, all the business of the country. They have the railroads, the steamship lines, the radio, the telegraph and telephone, the stock exchanges, all farming (through the subterfuge of soil conservation), and they did

have all manufacturing and all wholesaling and retailing until the Supreme Court unanimously decided that killing a chicken in New York City is not interstate commerce. Even now, less than a year after that decision was handed down, they are trying to bring back some kind of NRA which will let them do, in some other way, what the Supreme Court said they had no right to do.

An Authoritarian State is one in which a centralized authority,



Parts Are Part of your Profit

THERE is money in parts! In 1934, in this so-called land of the free, the owners of service stations paid \$517 million to automotive jobbers for parts and materials to be installed in Mr. John Q. Public's automobile.

That \$517 million, or more than one-half of a billion—if you like it better that way—isn't all of the picture by any means. It doesn't include nearly 2 billion for gas, several hundred million for lubricating oil, and some more millions for other incidentals. But we just want to talk about parts now.

Now if in round numbers there are 100,000 independent and dealer operated service stations in the United States, that would mean that each shop would install \$5,170 of parts and material. That's the wholesale price, on which the shop owner would get a mark-up of approximately 33⅓ per cent, or \$1,723. Of course some will install a lot more parts than that and

The Parts You Need

Ammeters,	Radiator
Instrument	Connections,
Board	Hose
Anti-Rattlers	Controls, Choke
Aprons, Splash	(Automatic)
Armatures	Controls, Gener-
Arms, Breaker	ator (Auto-
Asbestos, Sheet	matic)
Axles	Cores, Radiator
Balls, Gear Shift	Cork, Sheet
Lever	Covers,
Batteries, Storage	Distributor
Bearings, Anti-	Covers, Spring
Friction	Covers, Tire
Bearings, Con-	Cut-Outs, Reverse
necting Rod	Current
Bearings, Main	Decarbonizers,
Belts, Fan	Engine
Bolts, Connecting	Deflectors, Draft
Rod	Dimmers, Glare
Bolts, Spring	(Windshield)
Center	Disks, Clutch
Bolts, Spring	Disks, Universal
Shackle	Joint
Bolts, Steering	Disks, Wheel
Knuckle	Distributors,
Brakes, Power	Ignition
Amplifying	Dovetails
Unit	Drives and Parts,
Brushes, Gener-	Starter
ator, Horn and	Drums, Brake
Starter	Enamels
Bumpers, Auto-	Expanders,
mobile	Piston Ring
Bumpers, Spring	Expanders,
Bushings	Piston Skirt
Cable, Brake	Extinguishers,
Cable, Ignition,	Fire
Starting and	Fans, Electric
Lighting	Fasteners,
Cables, Storage	License Tag
Battery	Fenders
Caps, Crankcase	Fittings,
Breather	Lubricating
Caps, Gasoline	Fittings, Tube
Tank	Flashlights or
Caps, Hub	Lanterns
Caps, Radiator	Floats,
Caps, Tire Valve	Carburetor
Carburetors and	Fluid, Brake and
Parts	Shock
Carriers,	Absorber
Luggage	Flux, Soldering
Cases, Lamp	Frames, License
Bulb	Plate
Cement, Top	Fuses, Electric
Repair	Gages, Gasoline—
Chains, Timing	Auto Tank
Chains, Non-Skid	Type
Channels, felt	Gages, Water
Chargers, Bat-	Temperature
tery, for Home	Indicating
Use	Gaskets
Clamps, Hose	Gears
Cleaners, Air	Gears, Igniter and
Cleaners,	Oil Pump
Windshield	Gears, Starter
Clocks	Gears, Steering
Cloth, Abrasive	Gears, Timing
Cloth, Rubber	Gears,
and Fabric	Transmission
Clutches, Auto	Gears and
Coils, Generator	Pinions, Rear
Field	Axle
Coils, Ignition	Generators, Elec-
Compounds,	tric Lighting
Radiator Rust	Glass
Preventing	Graphite
Compounds, Tire	Guards, Bumper
Repair	Guards, Fender
Compounds,	Splash
Valve Grinding	Guides, Fender
Condensers,	Guides, Valve
Ignition	(Engine)
Condensers and	Heads, Cylinder
Relief Valves,	Horns

To Do The Job —

Hose, Radiator	Radiators, Engine
Hubs, Wheel	Cooling
Jacks, Car	Radio Sets, Auto-
Lifting	mobile
Joints, Universal	Reflectors, Safety
Keys, Valve Stem	Regulators,
Keys, Switch and	Carburetor
Starting	Removers, Paint
Lacquer	Resins, Synthetic
Lamps, Cowl,	Rests, Arm
Fender, Tail,	Rests, Heel
Parking, etc.	Rests or Rails,
Lamps, Fog	Foot
Lamps or Bulbs	Retainers, Valve
Lamps, Spot	Spring
Lenses, Lamp	Rings, Piston
Lighters, Electric	Rings,
Cigar	Wire Wheel
Lining, Brake	Rings and Seals,
Links, Shock	Oil and Grease
Absorber	Retaining
Links, Spring	Rivets, Brake
Shackle	Lining
Locks	Rods, Connecting
Lubricants	Rotors,
Lubricators,	Distributor
Combustion	Sandpaper
Chamber	Screws, Cap and
Mats, Floor	Set
Mats, Running	Screws, Machine
Board	Seats, Valve
Mirrors	Shackles, Spring
Molding, Drip	Shafts, Propeller
Molding,	Shafts, Rear Axle
Running Board	Shafts, Water
Mufflers, Exhaust	Pump
Nuts	Shims, Axle
Oilers, Spring	Caster
Oils, Lubricating	Shims
Oils, Combustion	Shims, Brake
Chamber	Lining
Ornaments,	Shock Absorbers
Radiator	Shoes, Brake
Packing	Signals, Direction
Packing, Valve	Indicating
(Engine)	Silencers,
Pads, Pedal	Carburetor
Pads, Seat	Intake
Paints	Sleeves, Cylinder
Paper, Abrasive	Sockets, Electric
Parts, Brake	Lamp
Parts, Coil and	Solder
Distributor	Speedometers
Parts, Fuel Pump	Springs, Leaf
Parts, Generator	and Coil
Parts, Starting	Starters, Motor
Motor Drive	Strips, Wind-
Parts, Storage	shield and
Battery	Window
Parts, Water	Weather
Pump	Supports, Brake
Parts, Windshield	Rod
Cleaner	Switches, Head-
Paste, Gasket	light Dimming
Making	Switches, Ignition
Patches, Top	Switches, Rear
Repair	Signal
Pedals,	Switches, Starter
Accelerator	Tape, Insulating
Pins, Cotter	and Tire
Pins, Hinge	Tape, Masking
Pins, Piston	Terminals, Stor-
Pipes, Tail	age Battery
Pistons	Terminals, Wire
Plates, Clutch	Tires and Tubes
Plates, Kick or	Traffic Signals
Scuff	Trunks
Plugs, Expansion	Tubing
Plugs, Spark	Valve Insides
Plugs, Tire	(Tire)
Repair	Valves, Engine
Points, Contact	Poppet
Pumps, Oil	Washers, Felt,
Circulating	Steel, Lock
Purifiers, Oil	Weights, Wheel
Racks, Trunk	Balancing



Makeshifters Often Go Broke

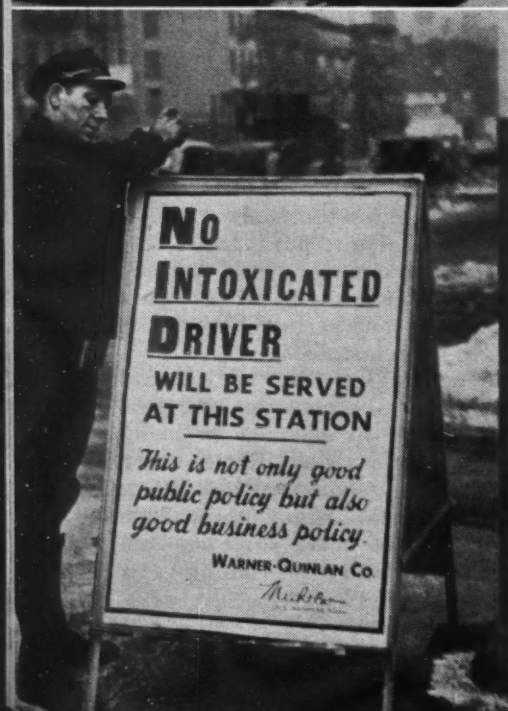
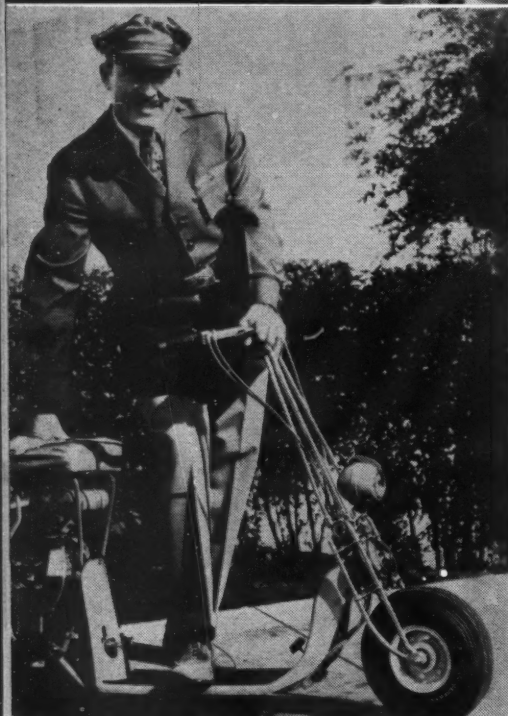
some will fall short of that mark. But the average is 1723 bucks, which gives some idea of the money to be made in parts.

Not only are parts profitable, but the installation of new parts results in greater customer satisfaction as the consequence of improved performance.

Of course there are many parts that can and should be repaired

rather than being discarded. For instance, it would be ridiculous to discard a valve that only required a little refacing to put it in A1 condition, or a cylinder block that can be reconditioned. But when a part is worn beyond certain limits it is foolish to reinstall it.

Accompanying this article are lists of parts, accessories and supplies, which in addition to being all-year-around profit items, enjoy increased sales during this spring selling season. Study these lists carefully and make sure you sell your share during the coming year.



Racing Season Opens

Pre-season Schedule Announced by Contest Board

Automobile racing's 1936 season, will open more than a week earlier than the 1935 campaign, it was announced by the Contest Board of the A.A.A. in issuing the latest revised edition of the pre-season schedule. The premier will be staged in Florida instead of Pennsylvania.

Ralph Hankinson, prominent eastern operator of headline speed events, for a time held the opening sanction for the 1936 season. But it was only

a few days ago that Bill Breitenstein, head of Southern Speedways, topped Hankinson's opening date by scheduling a sprint program at Tampa, Fla., on April 19. Hankinson's Reading (Pa.) Fair Grounds races carded for April 26 were thought for a time to be the season's opening.

Five National Championship classics—the races in which points toward the speed crown are awarded—have been scheduled for 1936 and two of them are new to the circuit.

The two additions are: the 400 or 500-mile race on the four-mile road racing course being built on Roosevelt Field, Mineola, Long Island, and a 100-mile title event at the mile Goshen, N. Y. track, scene of the Hambletonian horse racing classic. The Roosevelt Field classic has been definitely set for Oct. 12. The date was originally selected for June 27, but as a result of the weather the event was postponed to allow ample time to construct the new speed course.

It is well to keep in mind that the dates given below are subject to change without notice. If you plan to attend any of these races, it might be well to check at the track to make certain that races are definitely scheduled on dates listed.

Following is the pre-season schedule to which many dates will be added as the opening draws near:

DATE	PLACE
April 19	Plant Field Fair Gr., Tampa, Fla.
April 26	Reading, Penna. Fair Gr.
May 3	Hohokus (N. J.) Speedway
May 10	Atlanta, Ga.
May 17	Langhorne (Pa.) Speedway
MAY 30	INDIANAPOLIS SPEEDWAY
May 30	Hohokus (N. J.) Speedway
May 30	Altamont, N. Y.
May 31	Trenton, N. J.
June 6	Goshen, N. Y.
June 7	Roby (Ind.) Speedway
June 14	Langhorne (Pa.) Speedway
June 14	Charleston (W. Va.) Fair Gr.
June 21	Wisconsin State Fair Gr., Milwaukee
June 21	Hohokus (N. J.) Speedway
June 28	Wheeling (W. Va.) Fair Gr.
July 4	Lakewood, Atlanta, Georgia
July 4	Allentown (Pa.) Fair Gr.
July 4	Hohokus (N. J.) Speedway
July 5	Clarksburg (W. Va.) Fair Gr.
July 19	Charleston (W. Va.) Fair Gr.
Aug. 1	Harrington (Delaware) Fair
Aug. 2	Wheeling (W. Va.) Fair
Aug. 8	Lewistown (Pa.) Fair
AUG. 15	GOSHEN, N. Y.
AUG. 22	ILLINOIS STATE FAIR, SPRINGFIELD
Aug. 23	Clarksburg (W. Va.) Fair
Sept. 5	Flemington (N. J.) Fair
Sept. 5	Bedford (Pa.) Fair
Sept. 6	Charleston (W. Va.) Fair
Sept. 7	Flemington (N. J.) Fair
Sept. 7	Lakewood, Atlanta, Georgia
Sept. 7	Hohokus (N. J.) Speedway
SEPT. 12	NEW YORK STATE FAIR, SYRACUSE
Sept. 12	Rutland (Vt.) Fair
Sept. 18	Brockton (Mass.) Fair
Sept. 19	Brockton (Mass.) Fair
Sept. 20	Reading (Pa.) Fair
Sept. 26	Allentown (Pa.) Fair
Oct. 3	Richmond (Va.) Fair
Oct. 3	Trenton (N. J.) Fair
Oct. 10	Shelby (N. C.) Fair
OCT. 12	ROOSEVELT FIELD ROAD COURSE, ROOSEVELT FIELD, MINEOLA, L. I.
Oct. 25	Goshen, N. Y.

A. E. Barit Confirmed As New Hudson Head

At a meeting of the board of directors last month, A. Edward Barit was elected president of the Hudson Motor Car Co. to succeed the late Roy Chapin. Mr. Barit, who was first vice-president, treasurer and general manager, has been with the Hudson Motor Car Co. from its inception, and since Mr. Chapin's return to the presidency in 1933 at the expiration of his term as Secretary of Commerce, these two executives had been jointly responsible for the management and policy of the company. Mr. Barit also attained the title of general manager.

In succeeding to the presidency, Mr. Barit has received the highest position in a company with which he became connected as a boy of 20. His career is an outstanding example of the opportunity afforded by the automobile industry to men of talent and vision.

W.-O. Receivership Ends After 3 Years

The receivership of Willys-Overland Co., in effect three years, was ended last month when Judge George P. Hahn in Federal Court granted an application under Section 77-B of the Federal Bankruptcy Act and named David R. Wilson trustee. Application was filed by Harold W. Fraser, attorney for the reorganization committee formed by the late John N. Willys, and also counsel for the creditors' committee.

Directors of the company elected Wilson president and a director at a special meeting and approved the plan for lifting the receivership.

(Top) A. E. Barit named president of Hudson Motor Car Co. (Second from top) D. R. Wilson, new head of the reorganized Willys-Overland Co. (Third) Col. Roscoe Turner, speed pilot of the air, uses this novel "motor glide" on land. (Bottom) A sign announcing that this operator won't sell gas to intoxicated drivers.

Prize Winners in The Motor Age Contest

The winners of the monthly contest, announced in the February issue of MOTOR AGE, and which closed March 1, have been selected. They are:

First Prize
\$15.00

Edward A. Ross
St. Louis, Mo.

Second Prize
\$10.00

Louis B. Todd
Nashville, Tenn.

\$5.00 Awarded to
George Ginther
Spokane, Wash.

The monthly contests among readers of MOTOR AGE have become extremely popular.

More answers to February's questions were received than ever before. But your chance of winning remained just as good, for all papers are read carefully and judged fairly.

February's question was, "What Causes Front Wheel Shimmy?" And after going through the mass of entries our technical staff was more than willing to admit that the maintenance men who read Motor Age certainly know their stuff.

More contests later on, watch for them.

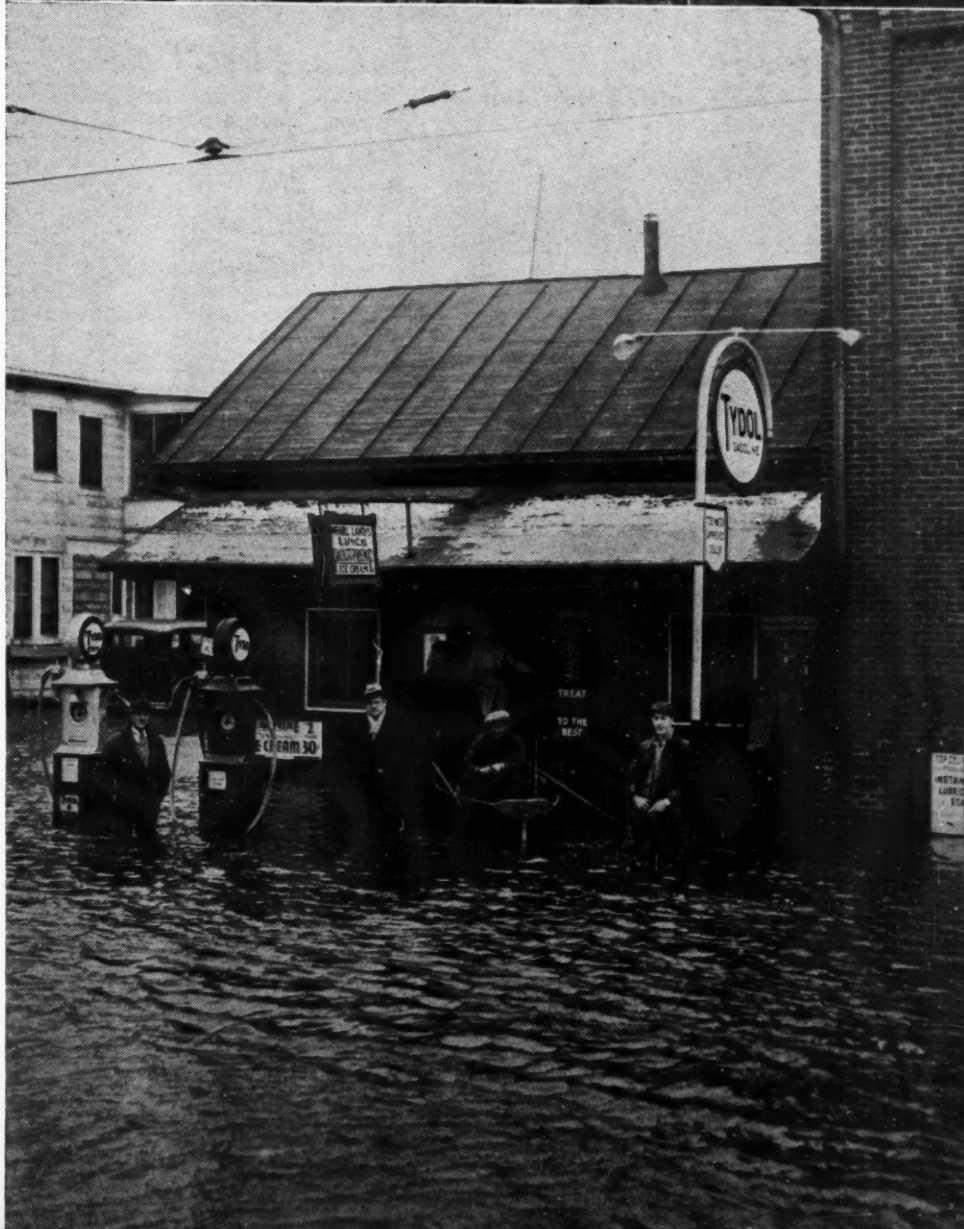
Flood Havoc Increases Maintenance Needs

Reconstruction has begun in the area affected by recent floods. And while this work progresses it is well for the independent repairman to remember that he, too, has work ahead of him, for flood waters likewise caused much damage to thousands of cars in the flooded areas.

There is gold to be panned from the muddy waters of the flood. Every automobile that was in water above its side rails requires a complete dismantling, a thorough cleaning and then careful reassembling. And that means plenty of work for all repair shops in the flooded areas.

Of course, many cars will be able to run after being thoroughly dried, but unless all the parts are thoroughly cleaned the cars will be back in the shops after a few thousand miles with worn gears and bearings. All the grit has to be cleaned from the interior of each housing.

So the floods will bring plenty of immediate work to the repair shops, and also work in the future on those cars whose owners took a chance and drove them without having them first thoroughly cleaned.





DOES THIS GET YOUR GOAT? For a long time, we've been anticipating motorized caddies, so this is perhaps a step in that direction . . . at least it's something new in golf caddies—goats. It was reported that they were used in a recent West Coast golf tournament and that the chief complaint was "My opponent got my goat."

Exide Hycap Battery For Fords and Terraplanes



The latest addition to the Exide Hycap line of batteries, a 19-plate, high-capacity battery for Fords and Terraplanes, has been announced by the Electric Storage Battery Co., Philadelphia. A feature of this battery is the use of extra heavy connectors designed to reduce the voltage losses between cells to a minimum. The type XL-191-S battery retails for \$13.45, with a 24 months' or 24,000-mile guarantee. Its rating is 110 ampere hours and it will give a discharge of 300 amperes for 4.3 minutes.

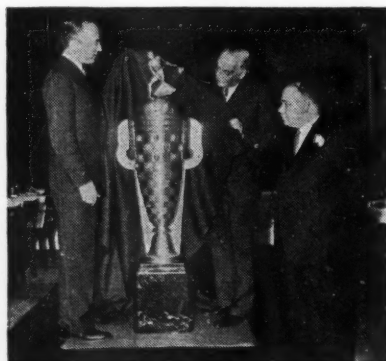
King Buys Buick

The reported purchase of a new Buick by King Edward VIII of England made sensational news in British automotive circles and was said to have turned a new page in Empire business history.

A.E.A. Elects Officers

At the A. E. A. 37th semi-annual meeting, February 24-25, in Chicago, Ill., the board of governors elected for President, H. H. C. Weed (Vice-Pres. & Gen. Mgr., Carter Carburetor Co., St. Louis); for Distributor Vice-President, C. T. Stevens (Sec., Reinhard Bros. Co., Inc., Minneapolis); for Manufacturer Vice-President, E. V. Oehler (General Sales Manager, Briggs & Stratton Corp., Milwaukee), and for Secretary-Treasurer, George S. Cole (Sec. & Gen. Mgr., The Leece-Neville Co., Cleveland). A. R. Sandt was appointed executive secretary to succeed Earl Turner.

New Indianapolis Trophy



CAPT. EDDIE RICKENBACKER, T. E. Meyers and K. E. Lyman, Borg-Warner official, unveil the \$10,000 silver trophy offered by the Borg-Warner Corp. for the 500-Mile Memorial Day classic at Indianapolis. The cup contains the names and records of the 23 winners of the race, with their heads sculptured in mezzo-relief.

New Products Forecast

Brighter Spring Prospect

One outstanding contribution to the success of the maintenance industry and to increased profits this spring is the new-product developments introduced by parts, tool, supplies and equipment manufacturers.

Behind all of this is the one idea: *how to help the serviceman increase his shop efficiency and his profit opportunities.*

That is why MOTOR AGE presents new and modern equipment, new models and new types of replacement parts and supplies. It's the kind of news service that readers of MOTOR AGE appreciate, for it keeps them posted on new ways to make money.

Throughout this issue, and in every issue of MOTOR AGE, you will find many descriptions of these new developments. They are fully described and in most instances, illustrated as well. Read them for your own profit and write us for any supplementary information you might like to have.

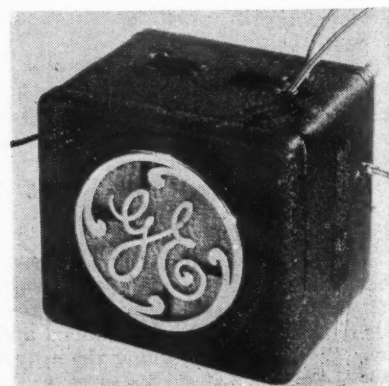
Wheel Aligning Chart

Service men can obtain an up-to-date wheel aligning specification chart, without charge, by writing the Bear Manufacturing Company, Rock Island, Ill. This chart lists information for passenger cars and trucks of the past several years, including the new 1936 models. It is 18 in. x 24 in.

Six Metal Tubes in

New G.E. Auto Radio

The new General Electric N-60 auto radio employs six metal tubes in a superheterodyne circuit with automatic volume control and variable tone control. The speaker, chassis, and power supply are all encased in a small, compact cabinet. Remote control is available for instrument panel mounting, with special mounting plates for various makes of cars. A large open-face dial and indicating needle afford easy tuning. The speaker is built in. Current consumption is 7.5 amperes. This set sells for \$49.95 and is distributed through the General Electric Company, Bridgeport, Conn.



Tide Comes in As Marion Wins Daytona Race

**Sand Ruts Hazard Drivers, Reduce
Speeds, Force Many To Quit Race**

Milt Marion, of St. Albans, N. Y., piloted a Ford V-8 to victory at Daytona Beach, Florida, on March 8, in the first annual Stock Car Beach and Road race. Marion's net running time for the 240.4 miles was 4 hours, 36.15 seconds, an average speed of 52.21 miles per hour. Marion had removed 28 standard Ford gaskets, replacing them with Form-a-Gasket No. 2. Cylinder head; fuel pump and rear end gaskets were retained. These, however, were coated with the same preparation.

The race was scheduled for 250 miles but when the ocean tide intruded on the beach running surface within 15 feet of the shore line, the checkered flag was flashed at the seventy-fifth lap on the field of 10 cars running at that time. The course was 3.2 miles in length. The 10 positions, except for seventh, were awarded to Ford V-8's. Seventh place went to Sam Collier at the wheel of a Willys "77."

Marion's elapsed time, including the handicap he gave to cars slower in qualifying time, was 4 hours, 54.42 seconds, an average speed of 48.94 miles per hour.

Of the 27 cars that started, the 10 finishers, their positions and prizes were:

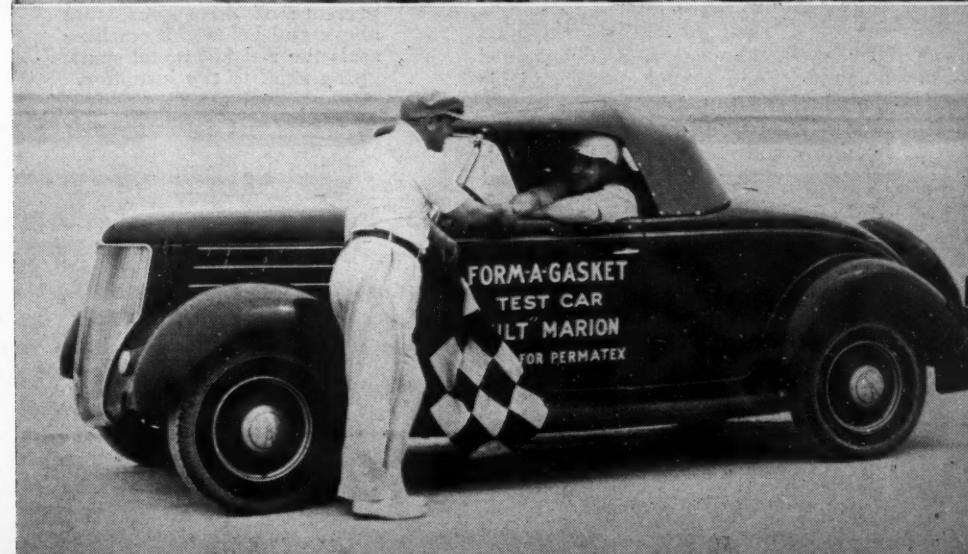
Place	Car	Driver
1	Ford V-8	Milt Marion
2	Ford V-8	Ben Shaw
3	Ford V-8	Tommy Elmore
4	Ford V-8	Sam Purvis
5	Ford V-8	Bill France
6	Ford V-8	"Hick" Jenkins
7	Willys "77"	Sam Collier
8	Ford V-8	Al Cusick
9	Ford V-8	Al Wheatley
10	Ford V-8	Ed Eng

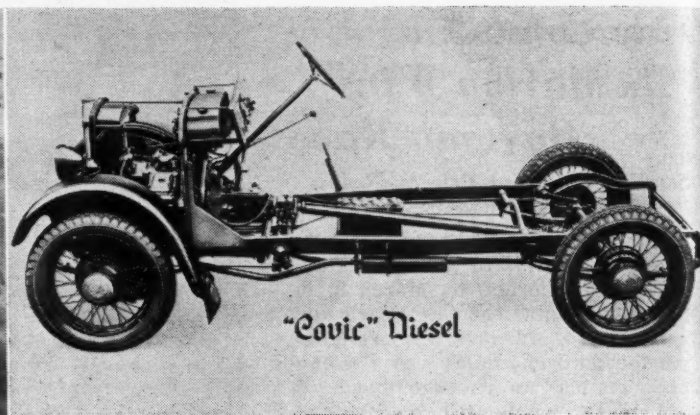
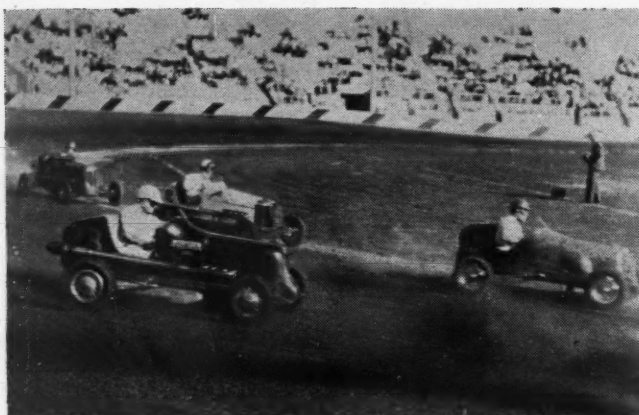
Virtually from the start, the race was tough going for the standard built cars, for deep ruts were churned into the two curves leading from and approaching the beach from the highway flanking the ocean front. The curves had been cut through the sand dunes and without a solid base, the cars soon dug into the sand. This handicap contributed to the low speed which was not at all representative of the performance of the cars. So difficult were the curves that cars were forced to back up many times and get a fresh start into the bend to "wade through" the sand. Otherwise the list of finishers would have been much greater.

The major mechanical difficulty encountered by the cars was transmission failure as a result of "gunning" the cars in low gear to get out of the sand ruts.

This event proved that even automobile racing with its heated competition has its comedy at times for on more than one occasion a driver was found shovelling his car out of the

(Continued on page 82)





ROY RUSSING was a surprise winner of the 200-lap Midget Auto Race (left) held at Gilmore Stadium, Los Angeles, Feb. 29. The "Covic" Diesel (right) is shown mounted in a half ton chassis. This type is made in England and similar jobs are expected to be manufactured here.

AC Engineers Develop New Equipment To Produce Gas Tight Spark Plugs

A new development in the science of spark plug manufacture, particularly important to development of higher powered and more efficient engines of the future, has been made by engineers of the AC Spark Plug division of General Motors.

The new development, a specially built machine, automatically produces a perfectly gas tight spark plug, which will withstand stresses greater than can be imposed by any engine yet conceived for the future. When a spark plug is not gas tight it deteriorates rapidly, overheats and may cause pre-ignition, higher gasoline consumption, loss of power and poor starting.

The old-fashioned, or original construction method of one-piece plugs was to "cold-crimp" the top of the shell over the insulator shoulder. This was improved upon by a hot crimping method introduced several years ago, and which proved adequate for engines of that period.

"Finally a completely automatic, specially built machine, operated by electricity, was developed in the experimental department."

In operation the machine electrically heats to a red glow a section of the steel shell of the spark plug. The shell collapses a predetermined amount. Solid copper gaskets inside the shell at top and bottom mould themselves around the insulator. The insulator and steel shell adjust themselves to each other while the metal is soft. When the heat is shut off, the shrinking of the shell makes the seal absolute.

Mr. Rabezana, chief engineer of AC's spark plug division, declared that development of this new method of producing leak-proof spark plugs "is undoubtedly one of the greatest fundamental improvements made in spark plugs in the past 25 years."



A leak-proof spark plug, made possible by development of this specially built machine, has been announced by AC Spark Plug Co. Under pressure of three tons from above and below the machine seals the red hot metal spark plug shell to the insulator.

**More
NEWS
Beginning On
Page 78**

Expect Covic Diesel Announcement Soon

Announcement of a new one-half and one ton chassis powered by the Covic diesel engine may be expected in the near future. This chassis, a product of the Moreland Motor Truck Company of Burbank, Calif., is to be an American adaptation of one already in use in England and European countries.

The Covic Diesel, known in England as the Victor Cub Diesel, is a two-cylinder horizontally opposed engine with a bore of 3 9/64 in. and a stroke of 3 15/16 in. Smoothness of operation, exceptional flexibility under traffic conditions, fuel performance of 60 miles per gallon and speeds in excess of 50 m. p. h. are some of the claims made for this engine. American rights for its manufacture and distribution have been secured by the Covic Diesel Engine Company, 443 Cotton Exchange Building, Los Angeles, Calif.

A.S.I. Show This Fall

The 1936 Automotive Service Industries Show will be held by the National Standard Parts Assn. and the Motor Equipment Manufacturers Assn. according to present arrangements. The Motor and Equipment Wholesalers Assn. which, heretofore, has participated in the show, will hold an Automotive Products Exhibition, it is announced.

Jack Frost

Jack Frost, who was elected executive vice-president of the National Automobile Dealers Association last January, died in an Omaha, Nebraska, hospital, March 26.

Mr. Frost was 40 years old. He had been active in the automobile business as a salesman and dealer since leaving college. He was a partner in the firm of Frost and French, Ford Dealers of Los Angeles, Calif.

He is survived by his widow, a son, and his parents, all of whom reside in Los Angeles.

MOTOR
AGE

TUNE-UP MANUAL FOR 1936 CARS



By
Bill Toboldt
and
Robert Hankinson

HERE, on the following pages, are complete service and tune up data on the cars of 1936 . . . a ready reference manual of important maintenance information.

It's your "dictionary" of helpful and profitable service methods. **KEEP IT HANDY!**

In addition to this tune up data on the cars of 1936—Tune Up Specifications on the older cars follow immediately after this section starting on page 66.



AUBURN

Model 654

Engine

Lycoming model WF. Six cylinder, 3 1/16 x 4 3/4 in. Firing order 1-5-3-6-2-4. Compression ratio 6.20 to 1. Compression pressure 98 to 100 lbs. at cranking speed.

Carburetor

Stromberg EX-22, downdraft 1 1/4 in. Idle adjustment—turn adjusting screw OUT for rich mixture, IN for lean. Main jets are non-adjustable, and control all intermediate speeds. Fuel level 5/8 in. below top of float chamber. Accelerating pump is provided with summer and winter adjustment—use hole in pump arm giving shorter stroke for summer. Calibration—venturi 1 3/32 in. Main discharge jet No. 32. High speed bleeder No. 70. Main metering jet .057 in. Pump discharge nozzle No. 70.

Distributor

Auto-lite KGB-4318. Single breaker type, automatic advance. Adjust points to .018 to .020 in. gap.

Ignition Timing

Clean and adjust breaker points to .018 to .020 in. gap. Set ignition so that No 1 cylinder fires 3 deg. or 1 flywheel tooth before top dead center mark on flywheel.

Ignition Coil

Auto-lite IG-4065. Current draw with engine stopped is 4 1/2 to 5 1/2 amps. Current draw with engine idling is 2 1/2 amps.

Spark Plugs

Standard equipment Champion 14 mm. type J-6. Proper gap is .025 in.

Valves

Operating tappet clearance .008 in. hot.

Valve Timing

With intake and exhaust valve lashed to .012 in. clearance, intake valve opens 5 deg. or 1 1/2 flywheel teeth before upper dead center, and exhaust valve closes 10 deg. or 3 flywheel teeth after upper dead center. When installing new timing chain, camshaft and crankshaft sprockets should be lined up so there are 12 links on lower side of chain between punch marks on the two sprockets.

Pistons

Aluminum, with invar strut and split skirt. Remove from below. Fit pistons so that a 7 to 12 lb. pull is required to withdraw a .002 in. feeler gage 1/2 in. wide from between the piston and cylinder wall. Install pistons with split skirt away from valve side of engine. Piston pin diameter 5/8 in. Pin locked in rod.

Connecting Rods

Remove from below. Bearings are spun-in babbitt type, fitted with .001 to .0025 in. clearance, with .004 to .009 in. side clearance. Rods are offset, and should be installed with short side of rod toward nearest main bearing and with oil hole toward valve side of engine.

Battery

U.S.L. model RN 15-A. 15 plate, 90 amp. hr. capacity, with positive terminal grounded.

Generator

Auto-lite GAR-4603-3. Adjustable third brush type. To increase charging rate remove cover band and shift third brush in direction of armature rotation. Maximum charging rate is 21 amps. at 8 volts.

Starter

Auto-lite MAJ-4032. Drive through Bendix gear. With armature locked, current draw is 555 amps. at 3 volts, developing 12 ft. lbs. of torque. Flywheel has 110 teeth.

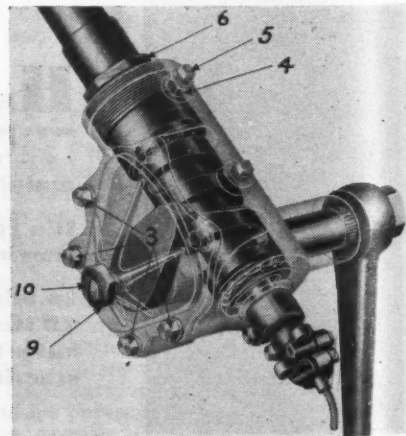
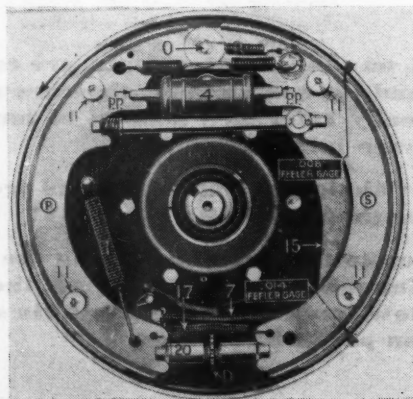
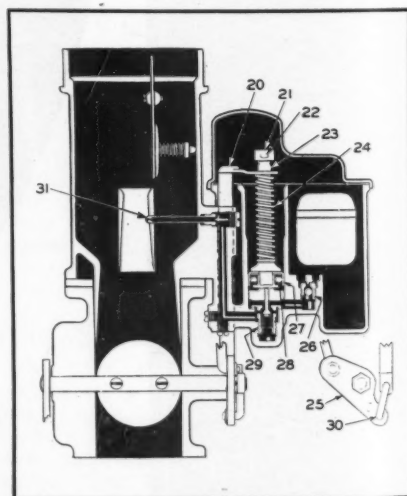
Brakes

Bendix, hydraulically operated, with mechanically operated hand brake on rear wheels for parking. Brake drum diameter 12 in. Lining per wheel, 24 9/32 in. x 1 1/2 in. x 3/16 in. To adjust, jack up all four wheels. Loosen eccentric lock nut and turn eccentric in direction of forward wheel rotation until slight drag is felt, then back off until wheel is free. Tighten eccentric lock nut. Remove cover plate and expand shoes by turning notched adjusting wheel until a slight drag is felt, then back off 7 notches. Adjust parking brake so that clevis pins will just enter cross shaft levers with all slack removed from cables when hand brake lever is in released position.

Steering

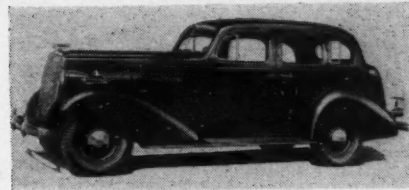
Ross cam and lever. To adjust end play of steering shaft, loosen lock

screw (5) about 3 turns. Loosen cover plate screws (3) about 3 turns. Tighten adjusting nut (6) until slight drag is felt when turning the steering wheel, then back off adjusting nut 1/2 of a turn, and tighten lock screw. To remove end play in pitman arm shaft, remove all but two diagonally opposite cover screws (3), and turn steering wheel to either extreme right or left. Now remove remaining cover screws (3) and remove cover, gaskets and shims. Remove one shim and reinstall cover with gaskets and remaining shims, and reinstall two cover screws. Turn steering wheel from extreme right to extreme left, checking for lash in pitman arm shaft at various points while turning. Some slight lash should be felt at all positions except in center or straight ahead position. Continue adjustment until slight drag is felt when passing through center position. Then reinstall remaining cover screws and fill housing with lubricant. Tighten adjusting screw (10) at inner end of pitman arm shaft just enough to remove end play.



BUICK

Series 36-40



Engine

Starting engine No. 4-2995239, Serial No. 2830899. Eight cylinder 3 3/32 x 3 3/8 in. Valve-in-head type. Firing order 1-6-2-5-8-3-7-4. Compression ratio 5.55 to 1. Compression pressure 118 lb. at 1000 r.p.m.

Carburetor

Stromberg EE-1, dual downdraft, 1 in., with Delco-Remy automatic choke control and with thermostatic heat control. Separate idle adjustment for each barrel of carburetor; turn adjusting screw OUT for richer mixture, IN for leaner. Main metering jets are non-adjustable, and control all intermediate speeds. Fuel level 15/32 in. below top of float chamber. Calibration-venturi 1 1/32 in. Main discharge jet No. 32-36. High speed bleeder No. 70. Metering jet .048 in. (With Heavy Duty Cleaner use .044 in. metering jet) By-pass jet No. 64. Idle discharge holes No. 56-60. Idle air bleed No. 54. Pump discharge nozzle No. 65. To adjust slow and fast idle, with engine warm, set idle stop

screw for 7 to 8 miles per hour in high gear on level road, with screw bearing against lowest lobe of idle cam. If it does not contact cam at this point, loosen nut and rotate cam hub as required.

Distributor

Delco-Remy 663-F. Single breaker type automatic advance with vacuum control. Breaker arm spring tension 19 to 23 oz. Adjust breaker points to .0125 to .0175 in. gap.

Ignition Timing

Clean and adjust breaker points to .015 in. gap. Set ignition so that No. 1 cylinder fires when "ADV" mark on flywheel lines up with index line on right side of flywheel housing at timing hole.

Spark Plugs

Standard equipment A. C. 3/8 in. 18 mm. type H-9. Proper gap is .020 to .025 in.

Valve Timing

Set No. 1 valve tappets to .015 in. clearance and insert .004 in. feeler gage to detect opening and closing points. Intake valve opens 8 deg. or slightly more than three flywheel teeth before top center, and exhaust valve closes 23 deg. or 8 1/2 flywheel teeth after top center. To check setting, place a dial indicator on exhaust valve spring cap of No. 2 cylinder with valve lashed to .015 in. Crank engine until valve has opened .150 in., and No. 1 and 8 T.D.C. mark on flywheel should be visible through timing hole in right side of flywheel housing. When installing timing chain, brass washers on chain should be in line with marks on the cam and crank sprockets. Brass washers are 10 links apart.

Pistons

Aluminum alloy, anodized. Remove from above. Fit each piston to pass of its own weight through cylinder bore with 1/2-in. feeler .0015 in. thick, and hold on 1/2-in. feeler .00225 in. thick, placed 90 deg. from pin boss.

Fit on rod with vertical slot on opposite side from oil spray hole in lower connecting rod bearing.

Connecting Rods

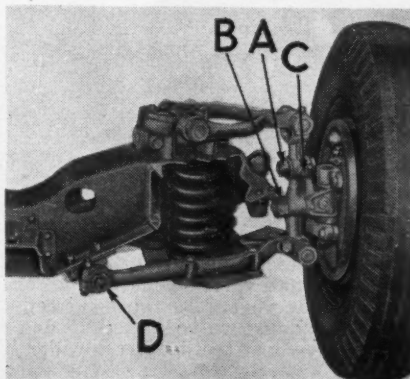
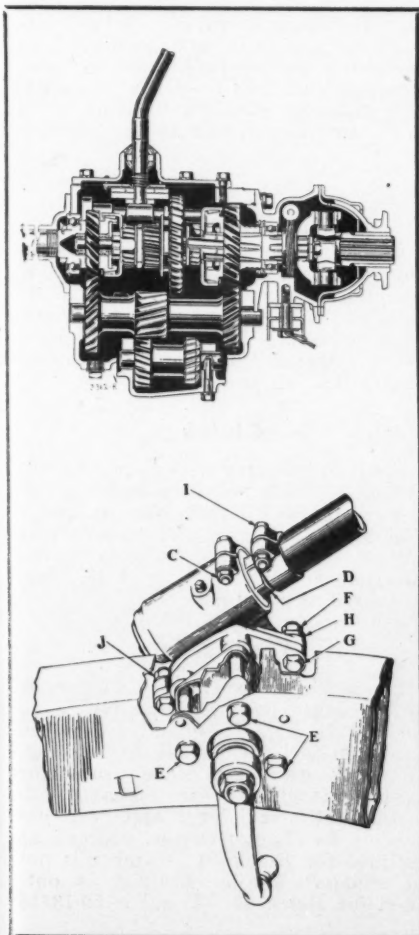
Remove from above. Centrifugal cast babbitt bearings, adjustable by removing shims. Install with marker on rod and cap pointing toward rear of engine.

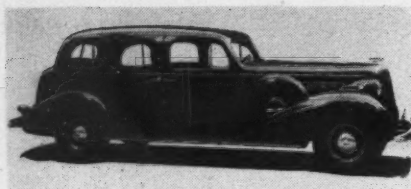
Steering

Saginaw worm and double roller type. Adjustments made with drag link disconnected. To remove roller shaft end play, loosen lock nut on inner end of roller shaft and turn screw right hand. To remove worm shaft end play, loosen housing clamp bolt "C" and column jacket clamp bolt "T" and turn adjusting nut "D" downward until a slight load is felt on the wheel when turning through extreme range. To remove backlash between worm and roller, center the steering wheel so that the indented spoke is straight down. Loosen three frame bolts "E" 1/4 turn, and loosen pivot bolt nut "J" 1/4 turn. Loosen eccentric bolt lock nut "F" 1/2 turn, and with one wrench on eccentric bolt "G" and another on eccentric sleeve "H," turn both in opposite directions by gradual stages, noting results by moving pitman arm at each step, with final adjustment just sufficient to remove backlash and have slight load when turning through center position.

Front Axle

Independent suspension. Caster 3 to 3 1/2 deg. Camber 1/4 deg. negative to 1/4 deg. positive. Toe-in 1/16 to 1/8 in. King pin inclination 3 1/2 to 4 1/2 deg. Caster is checked by placing a protractor against the finished ends of machined bosses on each end of the steering knuckle. To increase caster, jack up front wheels and loosen nut "A" on upper adjuster bolt and nut "B" on adjuster shaft one turn. Loosen lock nuts on adjuster screws, and turn rear adjusting screw counter-clockwise and turn front adjusting screw "C" clockwise, or right hand. To decrease caster, turn front adjusting screw counter-clockwise and rear screw clockwise. Recheck after removing jack. Camber is not adjustable. To check toe-in, place steering wheel with indented spoke straight down and check center steering arm for being midway between rear lower control arm bolts. Then check from front lower control arm bolts "D" to center of tires—distance should be the same on each side. If not, lengthen tie rod on one side and shorten tie rod on other side until these dimensions are the same. Then check total toe-in using regular toe-in gage. Tread is 58 1/8 in.





BUICK

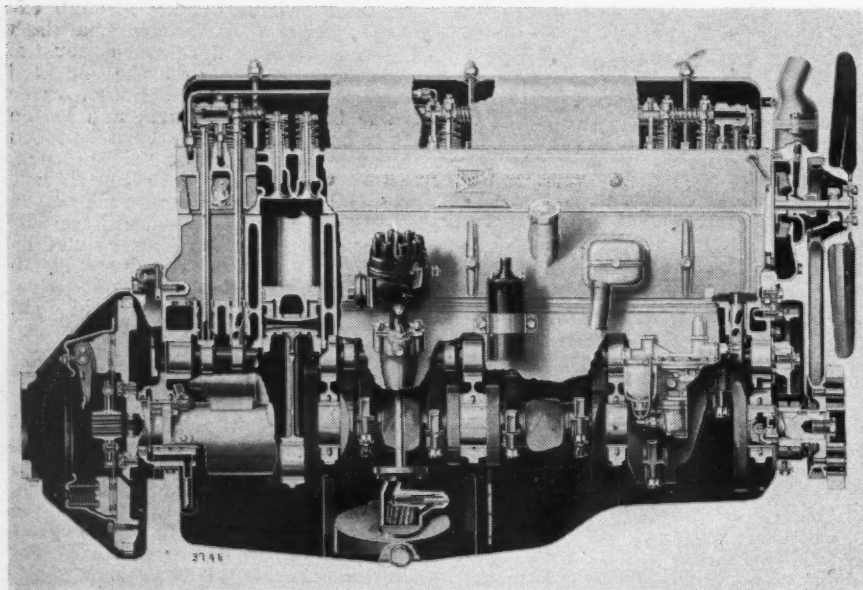
Series 36-90

Engine

Starting number 3001000, Serial No. 2830899. Eight cylinder, 3 7/16 x 4 5/16 in. Valve in head type. Firing order 1-6-2-5-8-3-7-4. Compression ratio 5.45 to 1. Compression pressure 108 lbs. at 1000 r.p.m.

Carburetor

Stromberg Model EE-22, dual down draft, 1 in. with Delco-Remy automatic choke control, and with thermostatic heat control. Separate idle adjustment for each barrel of the carburetor; turn needle valves OUT for richer mixture, and IN for leaner. Main metering jets are non-adjustable, and control all intermediate speeds. Fuel level 5/8 in. below top surface of float chamber. Calibration—venturi, 1 3/16 in. Main discharge jet No. 28. High-speed bleeder No. 70.



Metering jet .052 in. (with heavy duty cleaner use .051 in. jets). By-pass jet No. 65. Idle discharge holes No. 56-60. Idle air bleed No. 58. Pump discharge nozzle No. 65. A cold idle control is provided, adjusted as described under Buick 40. The carburetor is equipped with a Delco-Remy automatic choke. To check adjustment, disconnect rod from choke lever, and with rod and lever in full down position, rod should just fit into notch in lever. Install rod in lower hole in lever marked "R." Center hole provides leaner setting, while upper hole "H" is used only for highly volatile fuels.

Distributor

Delco-Remy Model 663-E. Single breaker, automatic type with vacuum

control. Breaker arm spring tension is 19 to 23 oz. Adjust breaker arm points to .0125 to .0175 in. gap. An octane selector provides manual adjustment of distributor for various grades of fuel. To adjust, it is necessary to raise the hood and loosen the two distributor mounting screws. Rotate distributor so pointer is toward low side of scale for low octane fuels and toward high side for high octane fuels.

Ignition Timing

Clean and adjust breaker points to .015 in. Set distributor so No. 1 cylinder fires when "ADV" mark on flywheel is directly opposite the index line on right side of flywheel housing. This is 4 1/4 flywheel teeth before top dead center. Index line on pointer under distributor should be opposite center line on scale. If it is not,

loosen pointer lock screw and adjust pointer.

Spark Plugs

Standard equipment A. C. 5/8 in. 18 mm. Type H-9. Proper gap is .020 to .025 in.

Valves

Operating tappet clearance .015 in., hot.

Valve Timing

Set No. 1 valve tappets to .015 in. clearance and insert .004 in. feeler gage to detect opening and closing points. Intake valve opens 14 deg. or 6 flywheel teeth before top dead center, and exhaust valve closes 25 deg. or 10 1/4 flywheel teeth after top dead center.

Pistons

Aluminum alloy, anodized. Remove from above. Fit each piston to pass of its own weight on a feeler ribbon 1/2 in. wide and .0015 in. thick, and hold on a ribbon 1/2 in. wide and .00225 in. thick, placed 90 deg. from pin boss. Assemble to rod with vertical slot on the opposite side from the oil spray hole in lower connecting rod bearing. Service pistons supplied with pins already fitted.

Connecting Rods

Remove from above. Centrifugal cast babbitt bearings, adjustable by removing shims. Assemble to crankshaft with oil spray hole toward camshaft side of engine.

Battery

Delco, Model 15-G-W., 120 amp. hr. capacity. Negative terminal grounded.

Generator

Delco-Remy, Model 936-P. Output controlled by third brush and voltage control regulator. To check generator output, ground field terminal at generator, disconnect wire at "GEN" terminal of regulator and connect it to positive ammeter lead. Connect ammeter ground lead to "GEN" terminal of regulator. Maximum output is 17 to 20 amps. cold, and 14 to 17 amps. hot.

Starter

Delco-Remy, Model 727-W. Drive through accelerator controlled, solenoid operated over-running clutch. Running free, current draw is 65 amps. at 5000 r.p.m. and at 5 volts. With armature locked, current draw is 600 amps. at three volts, developing 16 ft. lbs. of torque.

Clutch

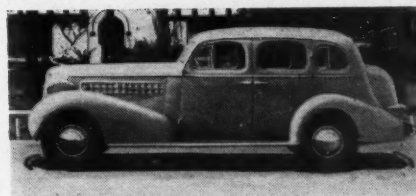
Single plate, dry disk type. To adjust pedal lash, set stop screw to allow 3/8 to 5/8 in. clearance at under side of floor board, and then adjust nut on rod connecting pedal to throw-out yoke to provide 3/4 to 1 in. lash, measured at pedal pad.

Front Axle

Independent suspension. Caster, 3/4 to 1 1/4 deg. Camber, negative 1/4 to positive 1/4 deg. Toe-in, 1/16 to 1/8 in. King pin inclination, 4 1/2 to 5 1/2 deg. To check caster, place protractor against machined bosses on caster adjuster, set spirit level and read degrees. To change caster, proceed as outlined for Buick 40. Camber is not adjustable. Toe-in obtained as outlined for Buick 40. Tread is 59 13/16 in.

CADILLAC

V 8 Model 36-60



Engine

Starting Serial No. 6010001. Eight-cylinder, 90 deg. V type, $3\frac{3}{4}$ x $4\frac{1}{2}$ in. Firing order 1L, 4R, 4L, 2L, 3R, 3L, 2R, 1R. Compression ratio 6.25 to 1.

Carburetor

Stromberg EE-24, dual downdraft, $1\frac{1}{4}$ in. There is a separate idling adjustment for each barrel of carburetor. Turn needle valves OUT for richer mixture and IN for leaner. Fuel level is $\frac{5}{8}$ in. below top of float bowl. Calibration—venturi $1\frac{3}{16}$ in. High speed bleeder No. 67. Main discharge jet No. 36. Main metering jet .058 in. By-pass jet No. 56. Idle discharge holes No. 56-60. Idle air bleed No. 42. Pump discharge nozzle No. 56. Automatic choke and fast idle built in, with provision made for manual operation of choke.

Distributor

Delco-Remy 665-D, single breaker type, automatic advance with vacuum control. Adjust breaker points to .012 to .018-in. gap.

Ignition Timing

Clean and adjust breaker points to .015-in. gap. Set ignition so that No. 1 cylinder fires when "IGN" mark on balancer lines up with pointer on timing case cover. Note: No. 1 cylinder is the front cylinder of the left bank. Engine fires 5 deg. or 2 flywheel teeth before top center.

Spark Plug

Standard equipment A.C. 14 mm. type K-7. Proper gap is .025 to .027 in.

Valves

Operating valve tappet clearances are automatically adjusted by the hydraulic lifter, and no means of mechanical adjustment is provided. Noisy tappet action is invariably due to dirt in the lifter mechanism, and can be corrected by cleaning the lifter assembly in gasoline. When lifter is reinstalled, it is necessary to run the engine for a period equivalent to several miles of driving before the oil works into the mechanism and the lifter becomes silent.

Valve Timing

Intake valve opens at top center, and exhaust valve closes 10 deg. or $4\frac{1}{3}$ flywheel teeth after top center.

Pistons

Aluminum alloy, anodized. Remove from above. To fit pistons, place .0015-in. feeler gage $\frac{1}{2}$ in. wide on thrust side of cylinder bore and enter piston. Piston should drop of its own weight. Repeat, using .002-in. feeler gage, and piston should lock. Piston

pin diameter $\frac{7}{8}$ in. Pin floats in piston and rod.

Connecting Rods

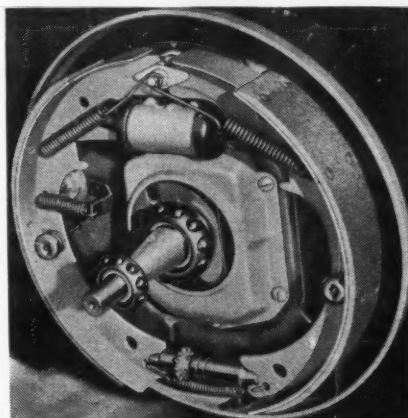
Remove from above. Bearings are removable, steel-backed, babbitt-lined. Install rods with oil hole in bearing end toward center of engine.

Main Bearings

Three, bronze-backed, babbitt-lined, removable type. Fitted with .0015-in. clearance. Thrust taken by center bearing. Crankshaft end play .001 to .005 in.

Battery

Delco 17 KW. Capacity 110 amp. hr. Positive terminal grounded.



Generator

Delco-Remy 961-D. "Peak Load" type, output controlled by voltage and current regulator. Maximum output 20 amps. at approximately 20 m.p.h. To check charging rate, ground regulator terminal "F" while engine is running at approximately 30 m.p.h.

Starter

Delco-Remy 727-V. Drive through solenoid-operated overrunning clutch. Running free, current draw is 65 amps. at 5 volts and speed of 5500 r.p.m. With armature locked, current draw is 600 amps. at 3 volts, developing 16 ft.-lbs. of torque. Flywheel has 156 teeth.

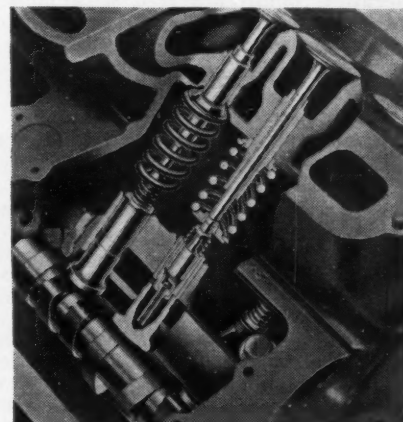
Brakes

Bendix, two-shoe, duo-servo action, hydraulic operation, with mechanical operation of hand brake on rear wheels for parking. Brake drum diameter 12 in. Brake lining per wheel, $25\frac{5}{8}$ in. x 2 in. x $\frac{3}{16}$ in. To adjust brakes, jack up all four wheels, loosen eccentric lock nut and turn eccentric in direction of forward wheel rotation until .010-in. feeler gage is snug at either end of secondary (rear) shoe between lining and drum. Tighten

lock nut. Expand brake shoes by turning notched adjusting wheel until drag is felt on brake drum. Adjust parking brake cables so clevis pin will just enter cross shaft lever. Then back off notched adjusting wheel until drums are free of brake drag.

Steering

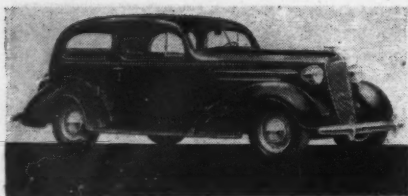
Saginaw worm and double roller type. To remove end play from sector shaft, disconnect drag link from pitman arm, loosen lock nut at inner end of sector shaft and turn adjusting screw right hand. To remove worm shaft end play, loosen housing clamp bolt and turn down adjusting nut until slight load is felt when turning wheel in extreme positions. To



remove backlash between worm and roller, loosen flange clamp bolts and eccentric lock nut. With one wrench on eccentric bolt and one on eccentric sleeve, turn each in opposite directions at the same time and by gradual stages, noting result by moving pitman arm. When backlash is removed, check to see that wheel turns from extreme right to extreme left positions without binding.

Front Axle

Independent suspension. Caster $1\frac{1}{2}$ deg. Camber $\frac{1}{4}$ to 1 deg. Toe-in $\frac{1}{16}$ in. King pin inclination 4 deg. 51 min. Tread is 58 in. To adjust caster, loosen yoke nut at outer end of lower suspension arm and the set screws in the upper yoke. Turn threaded pin in upper yoke to change caster, and check with protractor placed against machined bosses on front sides of the steering knuckle support arms. Camber may be decreased by installing shims between the steering knuckle support yoke and the lower suspension arm. No provision made for increasing camber except installing new parts. To adjust toe-in, locate intermediate steering arm in center position and adjust both tie rods to equal length.



CHEVROLET

Master & Standard

Engine

Six cylinder, 3 5/16 x 4 in. Firing order 1-5-3-6-2-4. Compression ratio 6 to 1. Compression pressure 112 lb. at cranking speed.

Carburetor

Carter W1-319S and 334S, 1 1/4 in. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. Standard setting is 1/2 to 1 1/2 turns open. Float level 3/8 in. from free end of float to cover with needle seated and cover inverted. Calibration—main venturi 1 1/4 in. Low speed jet No. 72 drill. Economizer jet .051 in. Accelerating pump discharge jet No. 72 drill. Metering rod .069—.056—.042 in. Metering rod jet .095 in. Accelerating pump provided with long and short stroke for winter and summer driving.

Distributor

Delco-Remy 645-G. Single breaker type, automatic advance with vacuum control. Adjust breaker points to .018 in. gap.

Ignition Timing

Clean and adjust breaker points to .018 in. gap. With octane selector set at zero, No. 1 cylinder fires when steel ball in flywheel lines up with pointer on right side of flywheel housing, which is 5 deg. or 1 1/4 flywheel teeth before top center. On acceleration at 20 to 25 m.p.h. vacuum advance is 17 deg. If ping is objectionable, advance may be retarded 5 deg. by installing spark control stop, Part No. 602111.

Spark Plugs

Standard equipment is A. C. 14 mm. type K-11. Proper gap is .032 in.

Valves

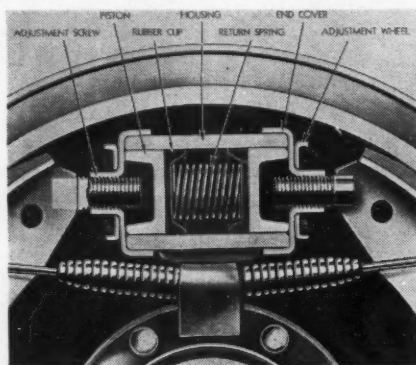
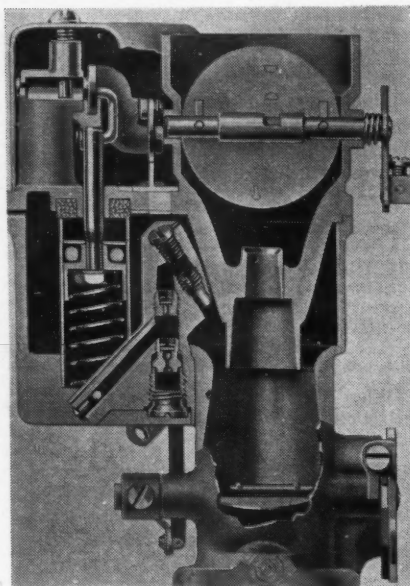
Operating tappet clearance, intake, .006 in.; exhaust, .013 in., hot.

Valve Timing

With intake valves lashed to .006 in. clearance and exhaust valves to .013 in., intake valve opens 9 deg. or 3 1/4 flywheel teeth before top center, and exhaust valve closes 1 deg. or 1/3 flywheel tooth before top center. When installing timing gears, the punch marks on the gears should be brought together and in line with the shaft centers.

Pistons

Cast iron, electro-plated. Remove from above. Pistons should be fitted so that they will pass with a .0014 in. thick feeler gage, and hold with a .0023 in. feeler gage placed at right angles to the piston pin. Piston pin diameter .990 in. Pin locked in rod.



Connecting Rods

Remove from above. Bearings are centrifugally cast babbitt, not removable. Install in engine with stamped number of rod and cap toward camshaft side of engine.

Battery

Standard uses Delco 13 AC. Master uses Delco 155-X. Fifteen plate, 90 amp. hr. capacity. Negative terminal grounded.

Generator

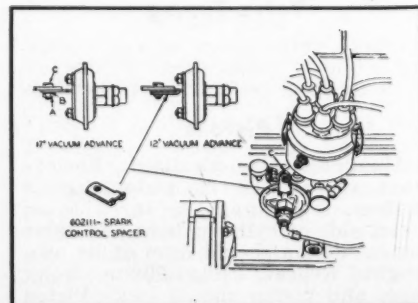
Standard uses Delco-Remy 946-C. Master uses Delco-Remy 935-V. Standard is conventional third brush type, with maximum charging rate of 14 to 16 amps. hot. Master is fixed third brush type, with output controlled by a resistance unit on the back of the lighting switch. Maximum charging rate is 17 amps. hot. To check Master charging rate, ground field terminal of generator to generator frame and connect test ammeter to generator.

Brakes

Huck hydraulic, with mechanically operated hand brake on rear wheels for parking. Brake drum diameter 11 in. Brake lining per wheel, 22 5/8 in. x 1 3/4 in. x 3/16 in. Standard uses semi-moulded lining, Master uses moulded lining. To adjust, jack up all four wheels. On knee-action models it is necessary to remove front wheels to uncover adjusting holes in brake drums. Disconnect hand brake cables at clevis just ahead of cables. Remove adjusting hole covers and insert screw driver, expand adjusting wheels by turning in clockwise direction as viewed from end of cylinder until brakes begin to drag. Then back off adjusting wheel four notches. Repeat on other three wheels. Set hand brake in released position and pull cables until all slack is removed, and adjust clevis so that pin will enter freely in clevis and rod. Adjust pedal to allow 1/4 in. clearance between pedal and under side of floor board.

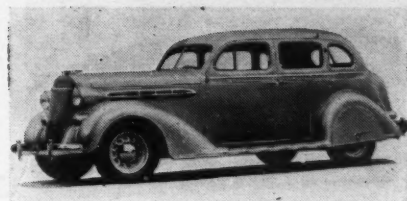
Steering

Saginaw. Standard and Master conventional models use worm and sector type. Master DeLuxe (knee-action) models use worm and double roller type. To adjust, disconnect drag link from pitman arm, and horn wire from mast jacket. Loosen "U" bolts holding mast jacket to instrument panel. Loosen housing clamp bolt, and turn mast jacket and clamp right hand as far as possible without stiffening action of steering wheel when turning through its entire range. To remove cross shaft end play, loosen lock nut on engine side of housing and turn in on adjusting screw until all end play is removed. Tighten lock nut. To remove backlash between worm and sector of roller shaft, locate front wheels in straight ahead position. Loosen housing-to-frame bolts on Master DeLuxe models and three cover stud nuts on Standard and Master Conventional models. Loosen eccentric lock nut 1/2 turn, and with one wrench on eccentric sleeve and another on eccentric bolt, turn the sleeve and bolt in opposite directions at the same time and by gradual stages, noting result by moving pitman arm back and forth.



CHRYSLER

Six Model C-7



Engine

Starting Serial No. 6823301. Six-cylinder, 3 $\frac{1}{8}$ x 4 $\frac{1}{2}$ in. Firing order, 1-5-3-6-2-4. Compression ratio 6 to 1.

Carburetor

Carter Model E6G1, downdraft, 1 $\frac{1}{2}$ in. Idle adjustment—turn adjusting screw OUT for rich mixture, IN for lean. Float setting is 5/64 in. from top of float to top of bowl casting, gasket removed. The accelerating pump link is provided with three holes, giving short, medium and long strokes. Use inner hole for short stroke, center hole for medium and outer hole for long stroke. Calibration—venturi 1 9/32 in. Idle orifice tube jet .0276 in. Idle air bleed .063 in. Main metering jet, calibrated to flow 282 to 286 CC. per minute. Can be replaced with leaner jet for altitude or high-test fuel. Accelerating pump discharge jet .0354 in. Automatic choke adjustment—remove carburetor air cleaner, insert No. 42 drill through hole in choke shaft and in line with slot in choke housing. Loosen choke lever clamp screw and lift up on the choke rod until choke valve in carburetor is completely closed. Tighten clamp screw and remove drill.

Distributor

Auto-lite IGS 4004-1. Single breaker type, automatic with vacuum control. Breaker point gap is .020 in.

Ignition Timing

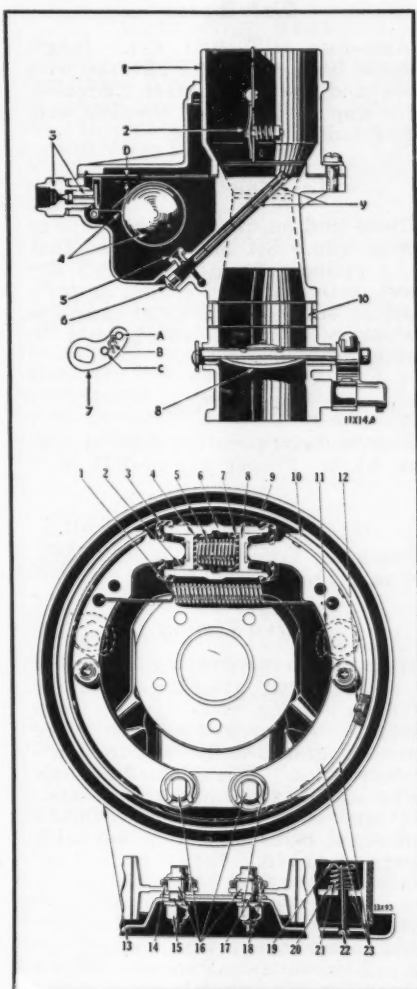
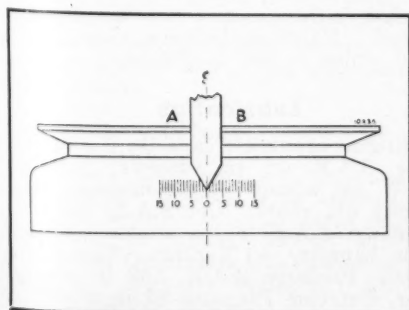
Clean and adjust breaker points to .020 in. gap. Set distributor so that No. 1 cylinder fires at top center position, as indicated by zero mark on crankshaft fan pulley lining up with pointer on timing gear cover. For final road setting, loosen distributor lock plate clamp screw and rotate distributor until a slight ping is heard on sudden acceleration with wide-open throttle.

Spark Plugs

Standard equipment A. C. 14 mm. type K-9. Proper gap is .025 in.

Valves

Operating tappet clearance, intake, .006 in.; exhaust, .008 in., hot.



Valve Timing

With intake valve tappet clearance set at .010 in., intake valve opens at top center position, and exhaust valve closes 2 deg. or $\frac{1}{4}$ flywheel tooth after top center. When installing new timing chain, zero marks on crankshaft and camshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, cam ground, T-slot. Remove from above. Fitted with .002 in. clearance between thrust side of piston and cylinder wall. Install with T-slot away from valve side of engine. Piston pin diameter 55/64 in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Bearings are shell type, steel-backed babbitt-lined. Install rod with oil hole in upper half of bearing toward valve side of engine.

Generator

Auto-lite GAR-4608-A5. Adjustable third brush type, with voltage regulator. To increase charging rate remove cover and shift third brush in direction of armature rotation. Maximum output is 21 amps.

Brakes

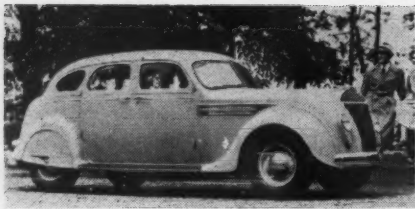
Lockheed hydraulic, two-shoe type, with mechanically operated hand brake on drive shaft for parking. Brake drum diameter 11 in. Brake lining per wheel, 22 5/32 in. x 2 in. x 3/16 in. To adjust, turn front shoe adjusting nut right hand until wheel is locked, then back it off until wheel is free. Turn rear shoe adjusting nut left hand until wheel is locked, then back it off until wheel is free. Check brake pedal to allow $\frac{1}{2}$ in. free movement before meeting resistance in braking system.

Steering

Gemmer worm and roller type. To adjust, jack up front wheels and remove drag link from pitman arm. To eliminate worm shaft end play, remove housing cover and carefully remove top shim. Reinstall cover and check wheel for stiffness. If end play still exists, remove another shim. To eliminate backlash between worm and roller, remove pitman arm from roller shaft, remove cover plate on top of housing and lift out roller shaft. Remove shims from shaft and reinstall shaft. Hold thumb on head end of shaft and rotate wheel to left, then turn wheel to right until roller is in center of worm. Still holding the roller shaft in place with the thumb, grip the splined end with the other hand and try to rotate the shaft. If backlash still exists, remove another shim and repeat checking operation until no backlash is present, with roller in center of worm. Reinstall cover plate and turn in on adjusting screw to remove shaft end play.

Front Axle

Independent wheel suspension. Caster 1 $\frac{1}{2}$ deg. Camber $\frac{1}{4}$ deg. Toe-in $\frac{1}{8}$ in. King pin inclination 10 deg. To adjust toe-in, set front wheels in straight-ahead position, loosen tie rod socket clamp bolts and adjust each tie rod to give equal toe-in on each wheel. To adjust camber, loosen clamp bolt on upper end of steering knuckle support arm and turn upper control arm pivot eccentric pin until there is a $\frac{1}{8}$ -in. gage thickness between upper end of the knuckle support arm and the outer end of the shock absorber arm, then make the camber adjustment within $\frac{1}{2}$ turn from this position. Caster will be within limits with eccentric pin in this position.



CHRYSLER

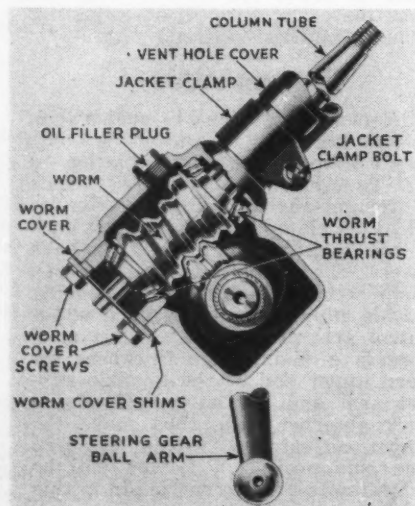
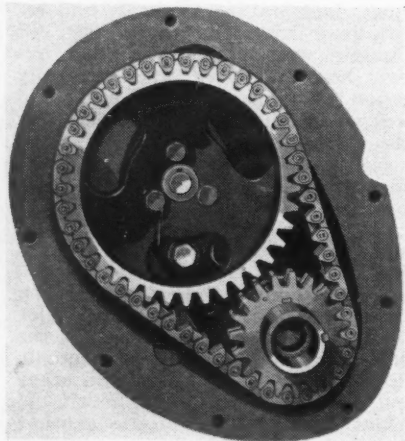
Airflow Imperial Eight

Engine

Starting Serial No. 7014901. Eight-cylinder, $3\frac{1}{4} \times 4\frac{1}{2}$ in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 6.50 to 1. Compression pressure 150 lb. at 1000 r.p.m.

Carburetor

Stromberg EE-22, dual downdraft, $1\frac{1}{4}$ in. Idle adjustment—turn adjusting screw IN for lean mixture, OUT for rich. There is a separate adjusting screw for each barrel of carburetor. Main jets are fixed type and control all intermediate speeds. Fuel level $\frac{3}{8}$ in. below top of float chamber. Calibration—venturi 1 $\frac{3}{16}$ in. High speed bleeder No. 65. Main discharge jet No. 28-36. Main metering jet .053 in. By-pass jet No. 53. Idle air bleed No. 46. Automatic choke rod should be set so that no backlash exists when choke valve is in closed position.



Distributor

Auto-Lite IGT 4001 C-1. Single breaker type, automatic advance with speed and vacuum control. Breaker point gap is .018 in. Breaker arm spring tension 9 to 13 oz.

Ignition Timing

Clean and adjust breaker points to .018-in. gap. Set distributor so that No. 1 cylinder fires 5 deg. or 2 flywheel teeth after top center, as indicated by scale on crankshaft impulse neutralizer lining up with pointer on timing gear case cover.

Spark Plugs

Standard equipment is A.C. 14 mm. type KL-9. Proper gap is .025 in.

Valves

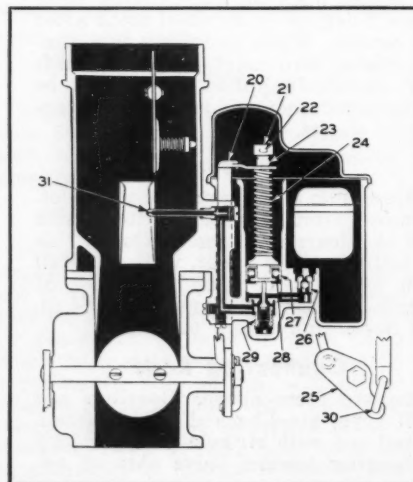
Operating tappet clearance, intake, .006 in.; exhaust, .008 in.

Valve Timing

With intake valve tappet set at .011 in. and exhaust at .012 in., intake valve opens 2 deg. or $\frac{3}{4}$ flywheel teeth before top center and exhaust valve closes 4 deg. or $1\frac{1}{2}$ flywheel teeth after top center. When installing new timing chain, zero marks on crankshaft and camshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, cam ground T-slot. Remove from above. Fitted with .002-in. clearance between cylinder wall and thrust side of piston. Install in engine with T-slot away from valve side of engine. Piston pin diameter $55/64$ in. Pin floats in rod and piston.



Connecting Rods

Remove from above. Bearings are steel-backed, babbitt or copper-lead-lined, removable type. Install with oil hole in upper half of bearing toward valve side of engine.

Battery

Willard WH 4-17. 17-plate, 136 amp. hr. capacity. Positive terminal grounded.

Generator

Auto-Lite GAR 4608-B5. Adjustable third brush type, with voltage regulator. To check output, connect a jumper wire from the fuse cup or the relay terminal marked "F" to ground. Moving third brush toward nearest main brush increases charging rate. Maximum output is 21 amps. at 8.6 volts.

Starter

Auto-Lite MAX 4003. Drive through solenoid-operated overrunning clutch. Flywheel has 146 teeth.

Clutch

Borg & Beck, single plate, dry disk. Adjust clutch pedal to allow $1\frac{1}{16}$ in. free movement, measured at pedal pad.

Brakes

Lockheed hydraulic, two-shoe type, with mechanically operated hand brake at rear of transmission for parking. Brake drum diameter 13 in. Brake lining per wheel, $24\frac{27}{32}$ in. x 2 in. x $\frac{1}{4}$ in. For adjustment, see instructions for Chrysler 6.

Steering

Gemmer, worm and roller type. For adjustment, see instructions for Chrysler 6.

Front Axle

Tubular axle, reverse Elliott type. Caster 2 deg. Camber $\frac{1}{2}$ deg. Toe-in $5/16$ in. King pin inclination $4\frac{1}{2}$ to $5\frac{1}{2}$ deg.

Rear Axle

Semi-floating, gear ratio 4.3 to 1. Pinion adjustment is by means of shims. Backlash between ring gear and pinion is .006 to .008 in.

Lubrication

Engine crankcase capacity 6 quarts. Use S.A.E. 30 in summer, S.A.E. 20-W in winter. Transmission capacity $6\frac{1}{4}$ pints. Use S.A.E. 160 in summer, S.A.E. 90 in winter. Rear axle capacity $4\frac{1}{5}$ pints. Use Extreme Pressure S.A.E. 160 in summer, Extreme Pressure 90 in winter.

DE SOTO

Airstream & Airflow Six



Engine

Starting Serial No. Airstream Custom 6043701, Airflow 5089001. Six-cylinder, 3 3/8 x 4 1/2 in. Firing order 1-5-3-6-2-4. Compression ratio, Airstream 6.0 to 1; Airflow, 6.50 to 1. Compression pressure at 1000 r.p.m., Airstream, 125 lb.; Airflow, 130 lb.

Carburetor

Carter E6G1, downdraft, 1 1/2 in. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. Standard setting is 1/4 to 1 turn open. Float level is 5/64 in. from top of float to top of float chamber. Calibration—venturi 1 9/32 in. Idle orifice tube jet .0276 in. Idle air bleed .063 in. Main metering jet calibrated to flow 282 to 286 CC per minute. Can be replaced with leaner jet for altitude or high test fuel. Accelerating pump discharge jet .0354 in.

Distributor

Auto-Lite IGS-4006-1. Single breaker type, automatic advance with speed and vacuum control. Breaker arm spring tension 9 to 13 oz. Proper gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020-in. gap. Set ignition so that No. 1 cylinder fires at top center, as indicated by zero mark on impulse neutralizer lining up with pointer on timing gear case cover.

Spark Plugs

Standard equipment A.C. 14 mm., type K-9. Proper gap is .025 in.

Valves

Operating tappet clearance, intake .006 in.; exhaust .008 in.

Valve Timing

With intake and exhaust valves lashed to .010-in. clearance, intake valve opens at top center, and exhaust valve closes 2 deg. or 3/4 flywheel tooth after top center. When installing new timing chain, zero marks on camshaft and crankshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, anodized. Remove from above. Fitted with .002-in. clearance between cylinder wall and thrust side of piston. Install with T-slot away from valve side of engine. Piston pin diameter 55/64 in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Bearings are removable type, steel-backed, babbitt or copper-lead-lined. Install with oil hole in upper half of rod bearing toward valve side of engine.

Battery

Willard. 15-plate, 119 amp.hr. capacity. Positive terminal grounded.

Generator

Auto-Lite GAR-4608 on S-1. Auto-Lite GAR 4808-A on S-2. Adjustable third brush type, with voltage regulator. To increase charging rate, remove cover band and shift third brush in direction of armature rotation. Maximum charging rate 21 amps. at 8.6 volts.

Starter

Auto-Lite MAX-4015. Drive through solenoid-operated overrunning clutch. Flywheel has 146 teeth.

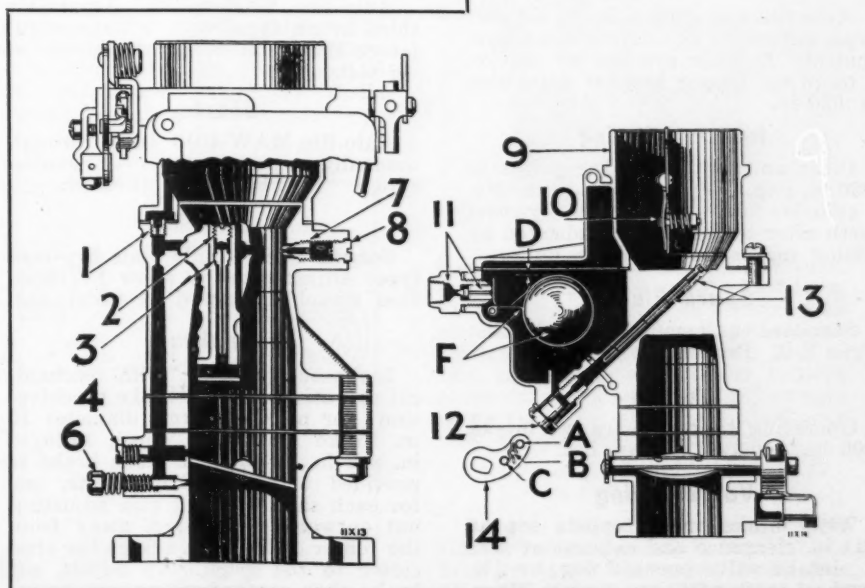
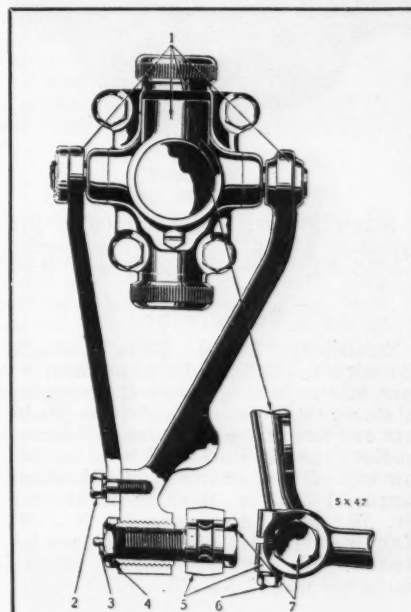
Steering

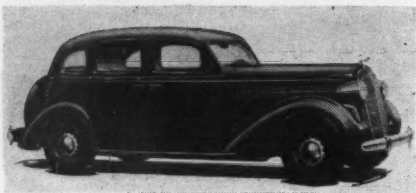
Gemmer worm and roller type. For adjusting instructions, see Chrysler 6.

Front Axle

Airstream has independent suspension, Airflow has tubular front axle. Airstream: caster 1 1/2 deg. Camber 1/4 deg. Toe-in 1/8 in. King pin inclination 10 deg. Airflow: caster 2 deg. Camber 1/2 deg. Toe-in 1/8 in. King pin inclination 9 1/2 deg. To adjust camber on Airstream model, loosen clamp bolt "6" in upper end of steering knuckle support arm, turn eccentric pin "7" in upper control arm until there is a 3/8-in. gage thickness between upper end of the knuckle support "5" and the outer end of the

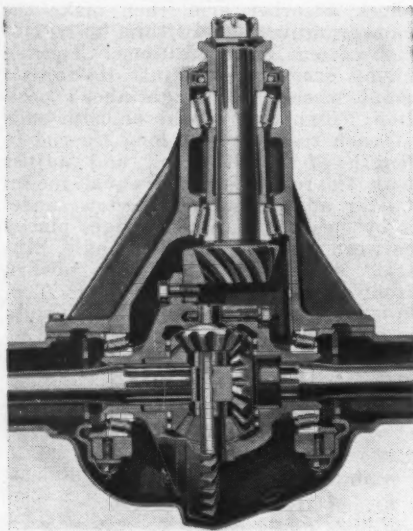
shock absorber arm, then make the camber adjustment within 1/2 revolution from this position. Tighten clamp screw. To adjust toe-in, set front wheels in straight-ahead position, loosen clamp bolts on both ends of each tie rod. Set long tie rod to length of 31 13/32 in., and adjust both tie rods to obtain equal toe-in. Caster adjustment on Airflow model is by means of tapered wedges placed between the spring and the axle. Install wedge with thin part toward front of car to increase caster. Toe-in is adjusted by loosening clamp bolts in tie rod ends and turning tie rod as desired.





DODGE

Six Model D-2



Engine

Starting Serial No. 4015051. Six cylinder, $3\frac{1}{4}$ x 4 in. Firing order 1-5-3-6-2-4. Compression ratio 6.50 to 1.

Carburetor

Stromberg Model EXV-2, single downdraft, $1\frac{1}{4}$ in. Idle adjustment—turn idle adjusting screw IN for lean mixture, OUT for rich mixture. Main jets are fixed type and cover all intermediate speeds. Fuel level is $\frac{5}{8}$ in. below top of float chamber. Calibration venturi $1\frac{3}{32}$ in. High speed bleeder No. 70. Main discharge jet No. 28. Main metering jet .058 in. By-pass jet No. 56. Idle air bleed No. 54. Pump discharge nozzle No. 70.

Distributor

Auto-lite IGS-4002-1, single breaker type, automatic advance with vacuum control. Breaker arm spring tension 9 to 13 oz. Proper breaker point gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020 in. gap. Set ignition so that No. 1 cylinder fires 4 deg. or $1\frac{1}{2}$ flywheel teeth after top center, as indicated by timing marks on fan drive pulley.

Spark Plugs

Standard equipment is A. C. 14 mm. Type K-9. Proper gap is .025 in.

Valves

Operating tappet clearance, intake .006 in.; exhaust .008 in. hot.

Valve Timing

With intake valve tappets set at .011 in. clearance and exhaust at .012 in., intake valve opens 6 deg. or $2\frac{1}{2}$ flywheel teeth after top center. When

installing timing chain, zero marks on crankshaft and camshaft sprockets should be brought together and in line with centers of shafts.

Pistons

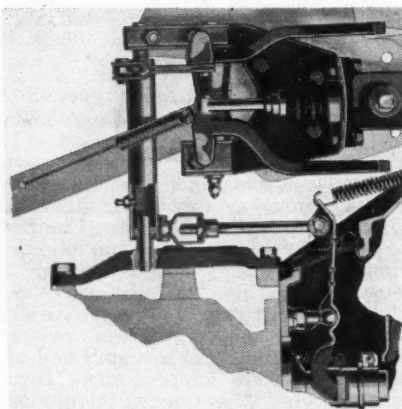
Aluminum alloy. Remove from above. Fit pistons with .0015 to .002 in. clearance at skirt on thrust side of piston. Piston pin diameter 55/64.

Connecting Rods

Remove from above. Bearings are replaceable, and should be fitted with .001 to .003 in. clearance. Install rods with oil hole in upper half of bearing toward valve side of engine.

Battery

Willard. Capacity 90 amp. hr. Positive terminal grounded.



Generator

Auto-lite GAR-4608-5. Adjustable third brush type, with voltage regulator. Maximum output 21 amps. at 8.6 volts.

Starter

Auto-lite MAW-4010. Drive through manually operated over-running clutch. Flywheel has 146 teeth.

Clutch

Borg & Beck, single plate dry disk type. Adjust pedal to allow $1\frac{1}{16}$ in. free travel, measured at pedal pad.

Brakes

Lockheed hydraulic, with mechanical operation of hand brake on drive-shaft for parking. Drum diameter 10 in. Brake lining per wheel, $19\frac{13}{16}$ in. x 2 in. x $\frac{13}{64}$ in. Each brake is provided with two adjustments, one for each shoe. Turning cam adjusting nut outward at the top, away from the center of the axle, brings the shoe closer to the drum. To adjust, set brake shoe cam adjusting nut on in-

side of brake support until the front shoe lining is solid against the drum and the wheel is locked, then back off until wheel is free. Then set the cam on the rear shoe out at the top until wheel is locked, then back off until free. Repeat on all four wheels. Adjust brake pedal to allow $\frac{1}{2}$ in. free travel, measured at pedal pad.

Steering

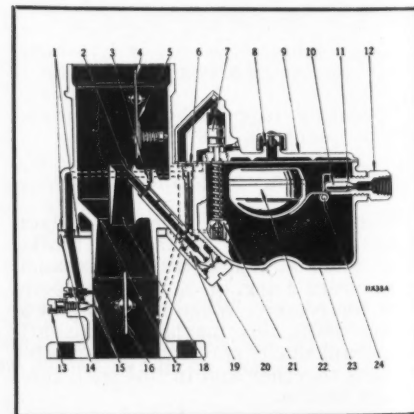
Gemmer worm and roller type. To adjust, jack up front wheels and disconnect drag link at pitman arm. To remove end play from steering column, loosen four worm cover screws and carefully remove top shim. Tighten four cover screws and check for stiffness. If end play still exists remove another shim. To remove end play in steering cross-shaft, loosen lock nut and turn in on adjusting screw at inner end of cross-shaft. After tightening lock nut, rotate steering wheel throughout its travel to make sure there is no bind. Adjustment for closer mesh of the roller with the worm is accomplished by the removal of shims which are in place behind the roller-shaft thrust washer.

Front Axle

I-beam type. Caster 2 deg. Camber $\frac{1}{2}$ deg. Toe-in $\frac{1}{8}$ in. King pin inclination $9\frac{1}{2}$ deg.

Rear Axle

Semi-floating type. Gear ratio 4.125 to 1. Pinion adjustment is by means of shims between the pinion-shaft bearing spacer and the inner race of the front bearing. Backlash between ring gear and pinion is .006 to .008 in.



Lubrication

Engine crankcase capacity 5 quarts. Use S. A. E. 30 in summer and S. A. E. 20-W in winter. Transmission capacity $2\frac{1}{2}$ pints. Use S. A. E. 160 in summer, S. A. E. 90 in winter. Rear axle capacity $3\frac{1}{4}$ pints. Use S. A. E. 160 in summer, S. A. E. 90 in winter.

FORD

V-8 Model 68



Engine

Eight-cylinder, 90 deg. V type, 31/16 x 3 3/4 in. Firing order 1-5-4-8-6-3-7-2. (Cylinders 1, 2, 3, 4 on right bank; 5, 6, 7, 8 on left bank.) Compression ratio 6.30 to 1. Compression pressure 105 lb. at cranking speed.

Carburetor

Stromberg Model EE-1, dual down-draft, 1 in. Idle adjustment—turn needle valve IN for lean mixture, OUT for rich. There is a separate adjustment for each barrel. Main jets are non-adjustable and control all intermediate speeds. Fuel level 15/32 in. below top of float chamber. Calibration—venturi 1 1/32 in. Main discharge jet No. 36. Main metering jet .048 in. High speed bleeder No. 65. By-pass jet No. 63. Idle air bleed No. 60. Fuel supplied to carburetor by A.C. pump.

Distributor

Own design, double breaker type, automatic advance with vacuum control. Automatic advance starts at 400 r.p.m. and reaches maximum of 20 deg. at 3000 r.p.m. Breaker arm spring tension 22 to 27 oz. Breaker point gap .012 to .014 in.

Ignition Timing

Clean and adjust breaker point gap to .012 to .014 in. Distributor can only be installed in the correct position. Recommended setting is 4 deg. or 1 1/4 flywheel teeth before upper dead center. A slotted screw on right side of distributor permits small range of advance and retard. Move upward to advance. Final road setting—back off the vacuum brake adjusting screw until the engine pings under load, then turn adjusting screw in just enough to remove ping, and tighten adjusting screw lock. Firing order 1R, 1L, 4R, 4L, 2L, 3R, 3L, 2R.

Spark Plugs

Standard equipment Champion 18 mm. No. 7. Proper gap is .025 in.

Valve Timing

With intake and exhaust valve tappets set to .0125 to .0135 in. clearance, intake valve opens 9 1/2 deg. or 3 flywheel teeth before upper dead center, and exhaust valve closes 6 1/2 deg. or 2 flywheel teeth after upper dead center. When installing new timing gears, mesh the marked tooth on the crankshaft gear with the marked tooth on the camshaft gear.

Pistons

Aluminum alloy, split skirt type. Remove from above. Fit pistons with a skirt clearance of .0005 to .0025 in. Install with arrow on head of piston pointing to front of car. If not marked, install with slot away from thrust side of cylinder. Piston pin diameter 3/4 in. Pin floats in rod and piston, with end play controlled by retainer in rod.

Connecting Rods

Remove from above. Bearings are removable, special composition material.

Battery

Ford, 17-plate. Capacity 96 amp. hr. Positive terminal grounded.

Generator

Air cooled, third brush regulation. To increase charging rate, remove generator cover strap and shift third brush in direction of armature rotation. Maximum charging rate of 15 amps. is reached at 25 m.p.h.

Starter

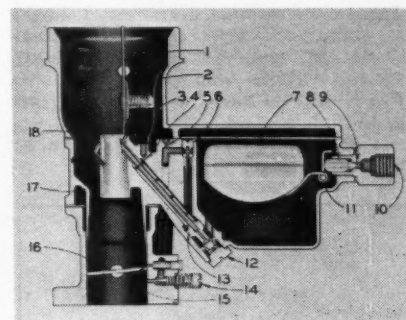
Equipped with Bendix drive. Engine cranking speed 100 r.p.m. Current to turn motor 225 amps. at 4.75 volts. Maximum torque 14 ft.-lb. Flywheel has 112 teeth.

Brakes

Ford, two shoe, mechanically operated, with hand brake operating on all four wheels for parking. Brake drum diameter 12 in. Brake lining per wheel, 26 1/2 in. x 1 1/4 in. x .185 in. To adjust, jack up all four wheels and release hand brake. Remove clevis pins from brake rods at wheel ends. Turn brake adjusting screw in until drag is felt at all four wheels. Then back off just enough so that brakes do not drag. Adjust pedal to cross shaft rod so as to obtain 1/2 in. clearance between hand lever rod and clevis pin. Adjust length of brake rods so that they are 1/32 in. short when all backlash in brakes has been eliminated, and install clevis pins and cotters. Set hand brake lever in first notch and check wheels for drag. If not equal, back off adjusting screw on tight wheel.

Steering

Gemmer, worm and sector type. To adjust, jack up front wheels and remove drag link from pitman arm. To remove end play in cross shaft, turn wheel to either extreme position, then back off 1/8 turn. Loosen lock nut at inner end of shaft and turn adjusting screw right hand. Tighten lock nut. Check to see that wheel does not bind in any position. To adjust mesh of sector teeth and worm it is necessary to drop the engine side pan. Turn wheel to center position, loosen three



housing cover nuts one-quarter turn, and eccentric sleeve nut one-half turn. Turn adjusting sleeve in clockwise direction slowly, checking lost motion in pitman arm. When lash can just be felt, tighten sleeve nut and housing cover nuts. An automatic adjustment is provided for the worm shaft end play and requires no adjustment.

Front Axle

Reverse Elliott "I" beam type. Caster 7 deg. Camber 1/2 deg. Toe-in 1/16 to 1/8 in. King pin inclination 8 1/4 deg. Tread is 55 1/2 in.

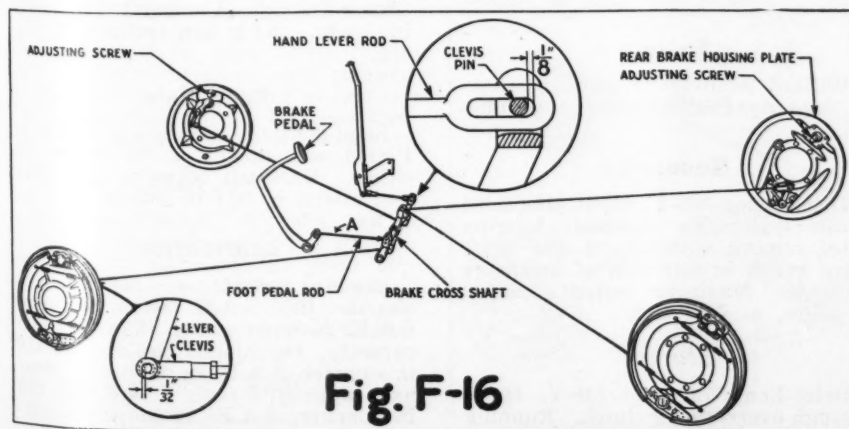


Fig. F-16



GRAHAM

Crusader Series 80

Engine

Starting Serial No. 300001. Six-cylinder, 3 x 4 in. Firing order 1-5-3-6-2-4. Compression ratio 6.8 to 1.

Carburetor

Marvel B-2SU, downdraft, 1 1/4 in. Idle adjustment—turn adjusting screw OUT for rich mixture, IN for lean. Main jets are fixed type and control all intermediate speeds. Float level is 1 1/4 in. from bottom of float to inside of bowl cover, measured with float and cover assembly held upside down. Accelerating pump is provided with three adjustments—use hole giving short stroke for summer, long stroke for winter, and medium stroke for normal temperature.

Distributor

Delco-Remy 623A, single breaker type, automatic advance with vacuum control. Breaker point gap is .018 in.

Ignition Timing

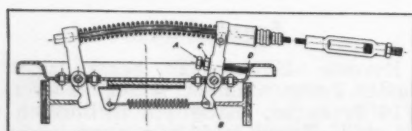
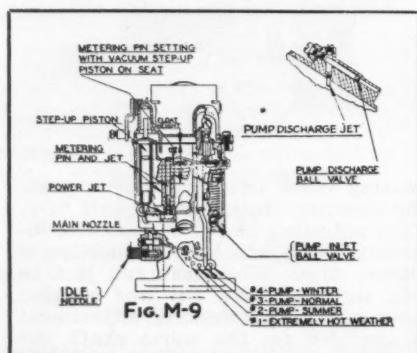
Clean and adjust breaker points to .018-in. gap. Set distributor so that No. 1 cylinder fires when "IGN" mark on flywheel lines up with pointer at inspection hole in right side of flywheel housing, which is 2 deg. or 3/4 flywheel tooth behind top dead center.

Spark Plugs

Standard equipment Champion 18 mm., type C-7. Proper gap is .025 in.

Valves

Intake valve head diameter, 1 33/64 in. Exhaust valve head diameter, 1 13/64 in. Valve stem diameter, 5/16 in. Intake valve seat angle 30 deg. Exhaust valve seat angle, 45 deg. Valve spring length, 1 21/32 in. at 34 lbs. pressure. Operating valve tappet clearance, .010 in.

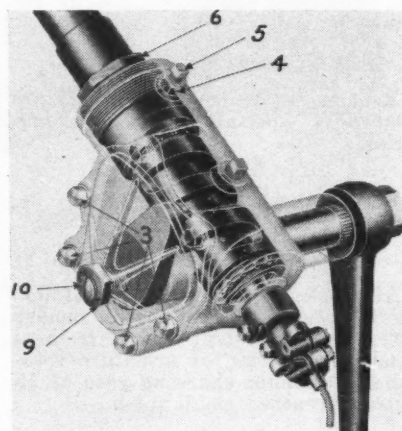


Valve Timing

With intake and exhaust valves lashed to .012-in. clearance, intake valve opens 4 1/2 deg. or 1 1/2 flywheel teeth before upper dead center and exhaust valve closes 4 1/2 deg. or 1 1/2 flywheel teeth after top dead center. When installing new timing chain, place No. 1 and 6 pistons on top dead center and turn sprockets so that there are 9 timing chain links or 10 pins between punch marks on sprockets.

Pistons

Aluminum alloy, split skirt with in-var struts. Remove from above. Pistons should be fitted so that a 3 to 6-lb. pull is required to withdraw a .002-in.-thick feeler gage 1/2 in. wide from between piston and cylinder wall. Install in engine with split skirt away from valve side. Piston pin diameter 13/16 in. Pin locked in rod.



Connecting Rods

Remove from above. Bearings are steel-backed, babbitt-lined, replaceable without removing rods from engine. Install with oil hole in upper half of bearing toward valve side of engine.

Battery

Willard WSB-13. 13-plate, 90 amp.-hr. capacity. Positive terminal grounded.

Generator

Delco-Remy 937-Y. Adjustable third brush type. To increase charging rate, remove cover band and shift third brush in direction of armature rotation. Maximum output, hot, is 14 amps. at 7.85 volts.

Starter

Delco-Remy 738-V or 738-Y. Drive through overrunning clutch. Running

free, current draw is 65 amps. at 5 volts and speed of 5000 r.p.m. With armature locked, current draw is 475 amps. at 3.6 volts, developing 12 ft.-lbs. of torque. Flywheel has 130 teeth.

Brakes

Lockheed hydraulic, with mechanically operated hand brake on rear wheels for parking. Brake drum diameter 9 in. Brake lining per wheel, 18 in. x 1 1/4 in. x 3/16 in. To adjust, jack up all four wheels, turn adjusting screw on front shoe toward the front until drag is felt, then back it off until wheel is free. Turn adjusting screw on rear shoe toward the rear until drag is felt, then back it off until wheel is free. Repeat on other three wheels. To adjust hand brake, check forward brake lever on each brake first. With cables slack, turn adjusting screw "A" until there is a barely perceptible amount of clearance between end of lever and brake shoe at point "B," and then tighten lock nut "C." Pull hand brake lever up into first notch on sector, and adjust turnbuckle on cable to remove all slack and place enough tension on cable to cause adjusting screw "A" to pull away slightly from flange at point "D."

Steering

Ross cam and lever. To adjust end play of cam, loosen lock screw "5" on top of housing and adjusting screw "10" on engine side of housing. Tighten column adjusting nut "6" until slight drag is felt when turning steering wheel, and then back it off 1/6 of a turn. Tighten lock screw and adjusting screw. To remove pitman arm shaft end play, place wheels in straight-ahead position and tighten adjusting screw "10" in engine side of housing until slight drag is felt when turning steering wheel through mid-position.

Front Axle

Reverse Elliott "I" beam type. Caster 2 1/2 deg. Camber 1 deg. Toe-in 1/8 in. King pin inclination 7 1/2 deg.

Rear Axle

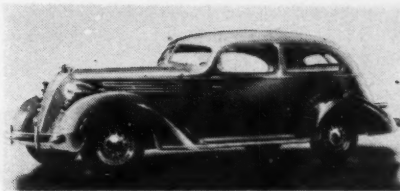
Semi-floating. Gear ratio 4.55 to 1. Pinion adjustment is by means of shims. Backlash between ring gear and pinion is .004 to .008 in.

Lubrication

Engine crankcase capacity, 5 quarts. Use S.A.E. 30 in summer, S.A.E. 20-W in winter. Transmission capacity, 1 1/4 pints. Use S.A.E. 160 in summer, S.A.E. 90 in winter. Rear axle capacity, 2 pints. Use S.A.E. 160 in summer, S.A.E. 90 in winter.

HUDSON

Six Model 63



Engine

Starting Serial No. 63101. Six-cylinder, 3 x 5 in. Firing order, 1-5-3-6-2-4. Compression ratio 6.25 to 1.

Carburetor

Carter W1-329S. Single, down-draft, 1 1/4 in. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. Standard setting is 1/2 to 1 turn open. Float level 3/8 in. from top of float to float chamber cover, with cover inverted and float needle seated. Calibration—primary venturi 11/32 in. Low speed tube jet No. 70 drill. Idle air bleed No. 52 drill. Accelerating pump discharge jet No. 72 drill. Metering rod .065-.060-.040 in. Accelerating pump provided with three adjustments—use hole giving short stroke for summer, medium stroke for normal temperature and long stroke for winter. Automatic choke with climatic control built in.

Distributor

Auto-Lite IGB 4601-B. Single breaker type, with automatic advance. Breaker point gap is .020 in.

Ignition Timing

Clean and adjust breaker point to .020-in. gap. Set distributor so that No. 1 cylinder fires at top dead center, or when "U.D.C. 1-6" mark on flywheel is in line with pointer of inspection hole in left side of flywheel housing.

Spark Plugs

Standard equipment is Champion 14 mm., type J-8. Proper gap is .022 in.

Valves

Operating tappet clearance, intake .006 in.; exhaust .008 in. hot.

Valve Timing

With intake valve lashed to .010-in. clearance, and exhaust valve lashed to .012-in. clearance, intake valve opens 10 2/3 deg. or 3 1/4 flywheel teeth before upper dead center, and exhaust valve closes 18 2/3 deg. or 5 1/4 flywheel teeth after upper dead center. When installing new timing gears, punch mark on tooth of crankshaft gear should mesh between the two punch-marked teeth of camshaft gear.

Pistons

Aluminum alloy, T slot cam ground. Remove from above. Fitted with .001-in. clearance at point 90 deg. from pin boss. Install in engine with T slot away from valve side of engine. Piston pin diameter 3/4 in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Bearings are

spun babbitt, adjustable by removing shims. Install in engine with long side of bearing toward rear of engine in cylinders 1, 2 and 4, and with long side of bearing toward front of engine in cylinders 3, 5 and 6.

Generator

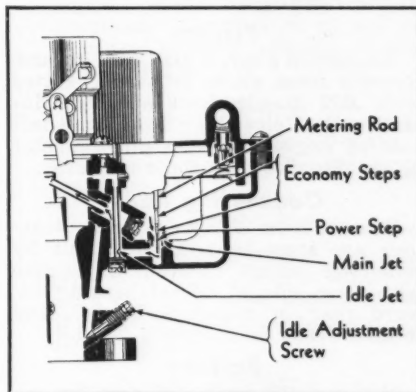
Auto-Lite GAR 4701. Adjustable third brush type, with voltage regulator. Maximum output is 22 amps. If generator fails to charge, check field circuit fuse located in knurled nut extending from the top of the regulator.

Starter

Auto-Lite MAB 4075. Drive through solenoid-operated Bendix gear. On cars equipped with Electric Hand it is necessary to disengage the clutch in addition to pressing the starter button to engage the starter. With armature locked, current draw is 775 amps. at 4 volts, developing 22 ft.-lb. of torque. Flywheel has 134 teeth.

Clutch

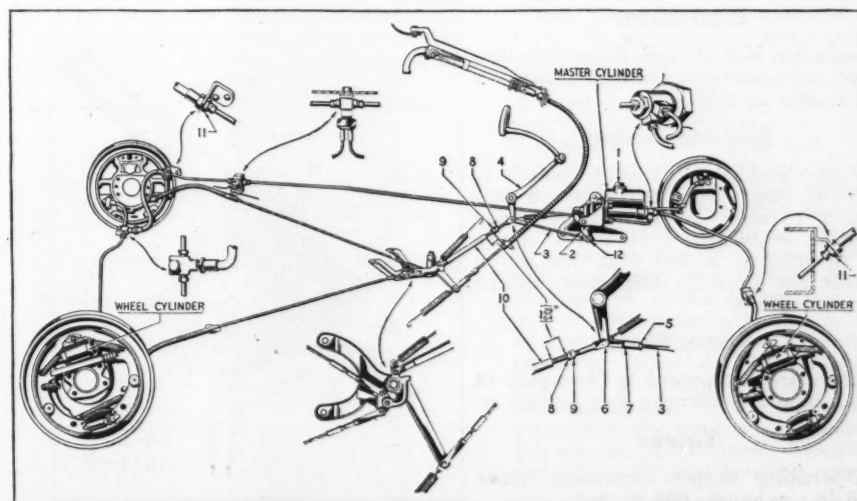
Own, single-plate type, operating in



oil. Adjust clutch pedal to provide 1 1/2 in. free movement, measured at pedal pad, before clutch starts to disengage. On cars equipped with automatic clutch control, pull backward on the power unit rod on left side of engine, while the accelerator pedal is depressed. When the rod is in its extreme rearward position there should be approximately 7/8-in. clearance between the back of the slot in the rod yoke and the clevis pin which attaches it to the operating lever.

Brakes

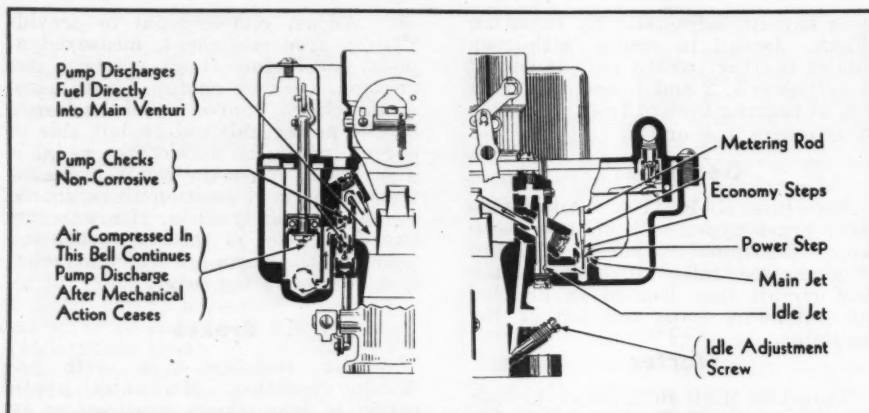
Bendix, two-shoe type, with hydraulic operation. Mechanical application to rear wheels provided as an override of hydraulic operation. Hand brake provides mechanical operation of rear-wheel brakes for parking. Brake drum diameter 10 in. Brake lining per wheel, 22 1/8 in. x 1 1/4 in. x 7/32 in. To adjust, jack up all four wheels and disconnect hand brake cables from equalizer bar. Loosen eccentric adjusting screw lock nut and turn eccentric adjusting screw in direction of forward wheel rotation until a .010-in. feeler gage is just snug between lining of secondary shoe and drum. Tighten lock nut. Expand shoes by turning notched adjusting wheel until wheels can just be turned by hand. Pull hand brake lever on, until equalizer bar plate is 1/8 in. from its stop. Pull rear brake cables tight and adjust ends so clevis pin just enters holes in plate. Release hand brake, and back off notched adjusting wheel until drums are free of brake drag. To adjust mechanical follow-up of hydraulic operation, place the equalizer bar against its stop, loosen lock nut 8 and turn adjusting nut 9 until rear face is 1 29/64 in. from front end of push rod, then tighten lock nut.





HUDSON

Eight Model 64-5-6-7



Engine

Starting Serial No. 64101, engine No. 1000. Eight cylinder, 3 x 4½ in. firing order 1-6-2-5-8-3-7-4. Compression ratio 6 to 1.

Carburetor

Carter 330-S, single downdraft, 1¼ in. Idle adjustment, turn adjusting screw IN for lean mixture, OUT for rich. Standard setting is ½ to 1 turn open. Float level is ⅜ in. from top of float to float chamber cover, with cover inverted and float needle seated. Accelerating pump is provided with three adjustments; use hole giving long stroke for winter, short stroke for summer and medium stroke for normal temperature. Calibration—primary venturi 11/32 in. Idle jet tube No. 70 drill. Accelerating pump discharge jet No. 70 drill. Main discharge nozzle No. 30 drill. Metering rod .066-.042 in. Metering rod jet No. 40 drill. Automatic choke with climatic control built in. Thermostatic spring housing cover may be adjusted by turning to right or left as indicated by calibrations on its top, for proper adjustment.

Distributor

Auto-lite IGB 4001-B. Single breaker type, with automatic advance. Breaker point gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020 in. gap. Set distributor so that No. 1 cylinder fires at upper dead center, or when "U.D.C. 1-8" mark on flywheel is in line with pointer on inspection hole in left rear engine support plate.

Spark Plugs

Standard equipment is Champion 14 mm., type J-8. Proper gap is .022 in.

Valves

Operating tappet clearance intake .006 in.; exhaust .008 in. hot.

Valve Timing

With intake valve lashed to .010 in. clearance, intake valve opens 10 2/3 deg. or 4 flywheel teeth before upper dead center, and exhaust valve closes 18 2/3 deg. or 7 flywheel teeth after upper dead center. When installing new timing gears, punch mark on tooth of crankshaft gear should mesh between the two punch marked teeth of the camshaft gear.

Pistons

Aluminum alloy, T slot, cam ground. Remove from above or below. Fitted with .002 in. clearance at skirt. Install with T slot away from camshaft side of engine. Piston pin diameter ¾ in. Pin floats in rod and piston.

Connecting Rods

Remove from above or below. Bearings are spun babbitt, adjustable by removing shims. Install in engine with long side of off-set bearing toward rear in cylinders 1-3-5-7, and toward front in cylinders 2-4-6-8.

Battery

National, 19 plate, 135 amp. hr. capacity. Positive terminal grounded.

Generator

Auto-lite GAR 4701. Adjustable third brush, with voltage regulator. Maximum output is 22 amps. cold, 17 amps. hot. If generator fails to charge, check 7½ amp. field fuse contained in the knurled cup extending from the top of the regulator.

Starter

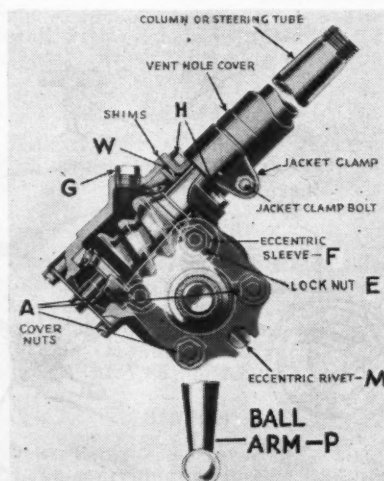
Auto-lite MAB 4075. Drive through solenoid operated Bendix gear. With armature locked, current draw is 775 amps. at 4 volts, developing 22 ft. lbs. of torque. It is necessary to disengage the clutch on Electric Hand equipped cars, in addition to pushing the starter button on the dash, to engage the starter. Flywheel has 134 teeth.

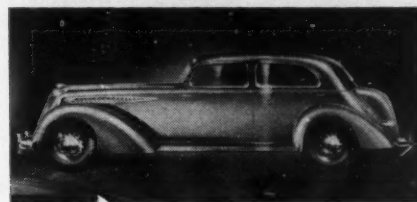
Brakes

Bendix, two-shoe, hydraulically operated, with provision made for mechanical application to rear wheels overriding hydraulic operation. Hand brake mechanically operated rear wheel brakes for parking. Brake drum diameter 11 1/16 in. Brake lining per wheel, 23 15/16 in. x 1¼ in. x 7/32 in. To adjust, jack up all four wheels and disconnect rear wheel cables from equalizer bar. Loosen eccentric lock nut and turn eccentric adjusting screw in direction of forward wheel rotation until a .010 in. feeler gage is snug between lining of secondary (rear) shoe and drum. Tighten eccentric lock nut. Expand shoes by turning notched adjusting wheel until heavy drag is felt and wheels can just be turned by hand. Pull the hand brake lever on, until equalizer bar plate is ½ in. from stop. Pull rear brake cables tight, and adjust ends so clevis pins just enter holes in plate. The rear face of the equalizer plate must be parallel to the face of the stop after this adjustment is made. Release hand brake, and back off notched adjusting wheel until drums are free of drag. To adjust mechanical follow-up to hydraulic operation of rear brakes, place equalizer bar against its stop and turn adjusting nut on rod until the rear face of the nut is 129/64 in. from front end of push rod.

Steering

Gemmer worm and sector. To remove worm shaft end play, loosen housing cover screws and remove shims between cover and housing. To remove sector shaft end play, loosen adjusting screw lock nut on inner end of sector shaft and turn in adjusting screw. Tighten lock nut. To eliminate backlash between worm and sector shaft, loosen four housing cover stud nuts ¼ turn, jack up front wheels and place in straight-ahead position. Turn eccentric sleeve right hand by gradual stages, noting result by moving pitman arm. Check for binding before tightening stud nuts.



M o d e l 6 2 1 - N

Starting Serial No. 5000. Eight-cylinder, 3 3/16 x 4 1/4 in. Firing order 1-4-7-3-8-5-2-6. Compression ratio 5.80 to 1. Compression pressure 113 lb. at cranking speed.

Carter WDO-317S dual downdraft, 1 in. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. There is a separate adjusting screw for each barrel of carburetor. Standard setting is $\frac{3}{4}$ to $1\frac{1}{4}$ turns open. Float level 5/32 in. between top of float and bowl cover with gasket removed. Calibration—primary venturi 11/32 in. Low speed jet No. 71 drill. Accelerating pump discharge jet No. 72 drill. Main discharge jet No. 30 drill. Metering rod .058-.055-.050 in. Metering rod jet No. 46 drill. Accelerating pump is provided with two adjustments. Use hole giving long stroke for winter and short stroke for summer. Automatic choke with climatic control built in.

Auto-Lite IGP-4003. Single breaker type, automatic advance. Breaker point gap is .022 in.

Clean and adjust breaker points to .022 in. gap. Set distributor so that No. 1 cylinder fires when line on flywheel is in center of inspection hole in right side of flywheel housing, which is 7 deg. or $2\frac{1}{4}$ flywheel teeth before top center.

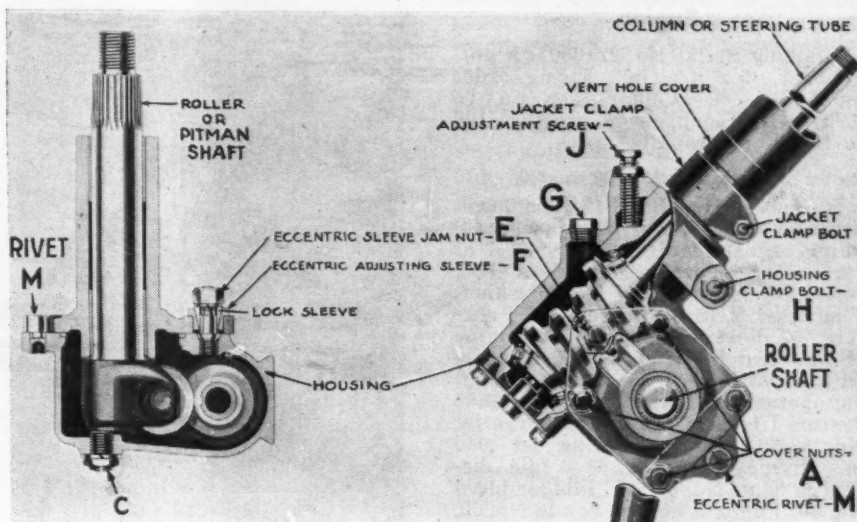
Standard equipment Champion 18 mm., type C-7A. Proper gap is .0275 to .030 in.

Operating tappet clearance, intake .006 in.; exhaust .013 in.

With intake valves lashed to .010 in. clearance and exhaust valves lashed to .017 in. clearance, intake valve opens 1 deg. or $\frac{1}{4}$ flywheel tooth after top center, and exhaust valve closes 3 deg. or $\frac{3}{4}$ flywheel tooth after top center.

Aluminum alloy, invar strut. Remove from below. Fit pistons so that it requires a 6 to 8-lb. pull to withdraw a .002-in.-thick feeler gage $\frac{1}{2}$ in. wide from between piston and cylinder wall. Piston pin diameter $\frac{3}{8}$ in. Pin floats in rod and piston.

Remove from below. Bearings are steel-backed babbitt lined, replaceable without removing rods from engine.

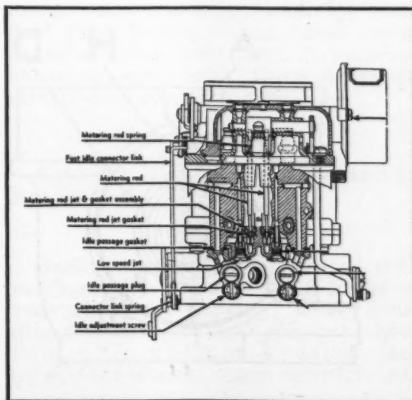


Five, steel-backed babbitt lined, replaceable without removing shaft from engine. Fitted with .001 to .003-in. clearance. Crankshaft thrust taken by center bearing. Shaft end play is .004 to .008 in.

Willard WH 2-15, 15-plate, 119 amp. hr. capacity. Positive terminal grounded.

Auto-Lite GAR 4620-5. Third brush type, with voltage control unit. Maximum charging rate, hot, is 19 amps. at 8.4 volts. Maximum output occurs at 28 m.p.h.

Auto-Lite MAB-4066. Drive through Bendix gear. Running free, current draw is 50 to 60 amps. at 5 volts and speed of 3700 r.p.m. With armature locked, current draw is 550 amps. at



3 volts, developing 15.5 ft.-lbs. of torque. Flywheel has 109 teeth.

Lockheed hydraulic, with mechanical operation of hand brake on rear wheels for parking. Brake drum diameter 12 in. Brake lining per wheel, 24 $\frac{3}{8}$ in. x 2 in. x 3/16 in. To adjust, jack up all four wheels. Turn adjusting nut on front shoe toward the front until the shoe drags against the drum, then back it off until the wheel is free. Turn the adjusting nut on rear shoe toward the rear until the shoe drags against the drum, then back it off until the wheel is free. Repeat on other three wheels.

Gemmer worm and roller. To adjust, jack up front wheels and disconnect drag link from pitman arm. Turn steering wheel to either extreme, then back up about $\frac{1}{8}$ of a turn. To adjust roller shaft end play, tighten adjusting screw on engine side of housing. To eliminate steering column up and down play, loosen thrust bearing adjusting screw "J" $\frac{1}{2}$ turn. Tighten housing clamp bolt "H" as much as possible without stripping, then back it off until lock washer under nut is about half flattened. Turn thrust bearing adjusting screw "J" in as far as possible, then back it out $\frac{1}{6}$ of a turn and tighten lock nut. To remove backlash between worm and roller, place steering wheel in straight-ahead position. Loosen housing cover nuts "A" $\frac{1}{4}$ turn and lock nut "E" $\frac{1}{2}$ turn. Turn eccentric adjusting sleeve "F" clockwise very gradually, checking at each movement the amount of backlash. Then tighten lock nut "E," and housing cover nuts "A."



LASALLE

Model 36-50

Engine

Starting Serial No. 2210001. Eight-cylinder, 3 x 4 $\frac{1}{2}$ in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 6.25 to 1. Compression pressure 100 to 110 lb. at cranking speed.

Carburetor

Stromberg Model EE-15, dual down-draft, 1 in. There is a separate idling adjustment for each barrel of carburetor. Turn needle valves OUT for richer mixture and IN for leaner. Fuel level is 15/32 in. below top surface of float chamber with engine idling. Automatic choke and fast idle built in, with provision made for manual operation of choke. Calibration—venturi 1 1/32 in. Main discharge jet No. 32-36. Main metering jet .046 in. By-pass jet No. 65. Idle discharge holes No. 54-60. Idle air bleed No. 50. Pump discharge nozzle No. 65.

To adjust automatic choke thermostat, remove thermostat case to allow spring "D" to reach a temperature of 70 deg. Inside of hook "H" should coincide with zero mark on case. Reinstall case so that hook "H" contacts pin with no tension, and with choke valve "A" in wide open position. Revolve case 17 notches rich, and fasten screws securely.

Distributor

Delco-Remy 663-J, single breaker type, automatic with vacuum control. Breaker point gap .015 in.

Ignition Timing

Clean and adjust breaker points to .015-in. gap. Set ignition so that No. 1 cylinder fires when mark on vibration damper lines up with pointer on timing chain cover, which is 8 deg. or 3 $\frac{1}{4}$ flywheel teeth before top center.

Spark Plugs

Standard equipment is A.C. 14 mm., type K-9. Proper gap is .025 in.

Valves

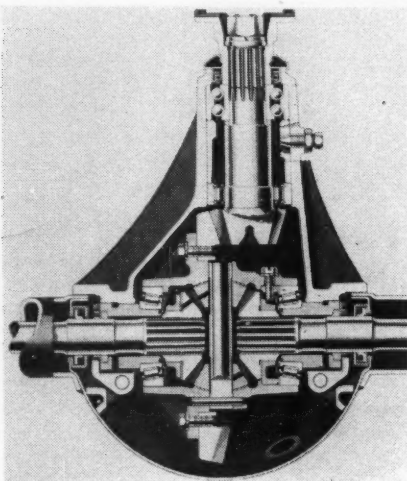
Operating tappet clearance, intake .006 in.; exhaust .009 in., cold.

Valve Timing

With intake valve clearance set at .015 in., intake valve opens 6 deg. or 2 $\frac{1}{2}$ flywheel teeth after top center, and exhaust valve closes 5 deg. or 2 flywheel teeth after top center. When installing timing chain, the timing marks on camshaft and crankshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, anodized. Remove from below. To fit pistons, place .0015-in. feeler gage $\frac{1}{2}$ in. wide on thrust side of cylinder bore and enter piston in bore in its running position. Piston should drop of its own weight. Repeat operation, using .002-in. feeler



gage. Piston should lock. Pin diameter 55/64 in. Pin locked in piston.

Connecting Rods

Remove from below. Bearings are removable, steel-backed, babbitt-lined.

Battery

Delco Model 17 K. W. Capacity 110 amp. hr. Positive terminal grounded.

Generator

Delco-Remy 961 D. Non-adjustable third brush. Output controlled by voltage regulator. Maximum output 20 amps. at approximately 20 m.p.h.

Starter

Delco-Remy 727-N. Drive through solenoid-operated overrunning clutch. Running free, current draw is 65 amps. at 5 volts and speed of 5500 r.p.m. With armature locked, current draw is 600 amps. at 3 volts, developing 15 ft.-lbs. of torque. Flywheel has 145 teeth.

Brakes

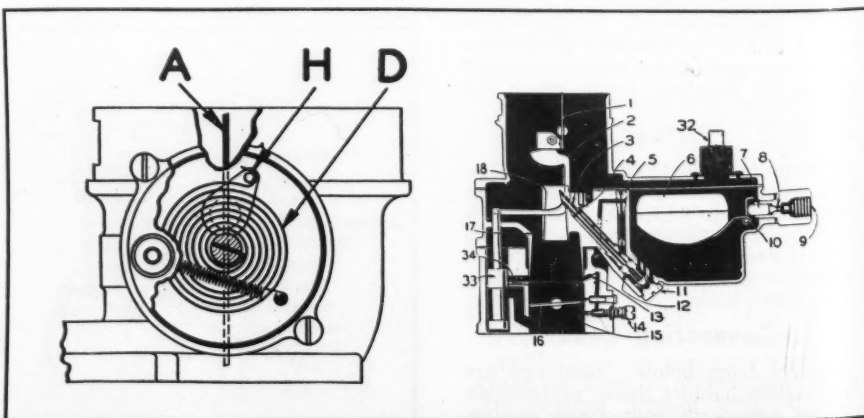
Bendix, hydraulic, duo-servo operation, with mechanical operation of hand brake on rear-wheel brakes for parking. Brake drum diameter 12 in. Brake lining per wheel, 25 $\frac{1}{8}$ in. x 2 in. x 3/16 in. To adjust brakes, jack up all four wheels. Loosen eccentric lock nut and turn eccentric in direction of forward wheel rotation until .010-in. feeler gage is snug at either end of secondary (rear) shoe, between lining and drum. Tighten lock nut. Expand brake shoes by turning notched adjusting wheel until drag is felt on brake drum. Adjust parking brake cables so clevis pins will just enter cross shaft levers. Now back off notched adjusting wheel to free drums of all drag.

Steering

Saginaw worm and roller type. To remove end play from sector shaft, disconnect drag link from pitman arm, loosen lock nut at inner end of cross shaft and turn adjusting screw right hand. To remove worm shaft end play, loosen housing clamp bolt and turn down adjusting nut until slight load is felt when turning wheel in extreme positions. To remove backlash between worm and roller, loosen housing clamp bolts, loosen eccentric lock nut. With one wrench on eccentric bolt and one on eccentric sleeve, turn each in opposite directions at the same time and by gradual stages, noting result by moving pitman arm. When backlash is removed, check to see that wheel turns from extreme right to extreme left position without bind.

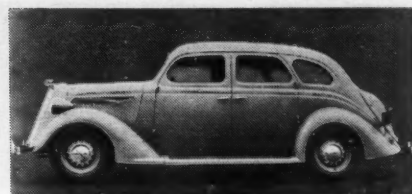
Front Axle

Independent suspension. Caster 2 deg. Camber 1 deg. Toe-in $\frac{1}{8}$ in. King-pin inclination 4 deg. 51 min. Tread 58 $\frac{1}{2}$ in. For adjusting instructions, see Cadillac 36-60.



LAFAYETTE

Model 3610



Engine

Starting Serial No. L-23101. Six cylinder $3\frac{1}{4} \times 4\frac{1}{2}$ in. Firing order 1-5-3-6-2-4. Compression ratio 5.61 to 1. Compression pressure 100 lbs. at cranking speed.

Carburetor

Marvel 10-1603, downdraft, $1\frac{1}{4}$ in. Idle adjustment—turn adjusting screw IN for lean mixture, OUT for rich. Float level $1\frac{1}{8}$ in.—remove bowl cover and float assembly, turn assembly upside down and measure from flange of cover to bottom of float. Main jets are fixed type, and control all intermediate speeds. Accelerating pump is provided with three adjustments; center hole is for normal operation, upper hole is for summer and lower hole is for winter.

Distributor

Auto-Lite IGB 4317. Single breaker type, automatic advance. Breaker point gap is .020 in.

Ignition Timing

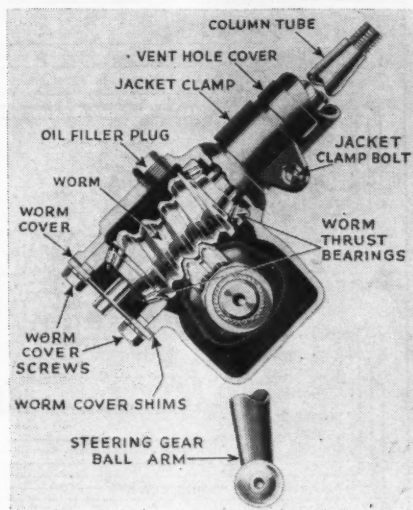
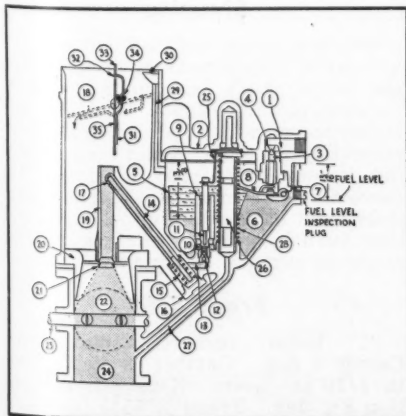
Clean and adjust breaker points to .020 in. gap. Set distributor so that No. 1 cylinder fires 10 deg. or 3 fly-wheel teeth before top center, as indicated by IGN marked on vibration damper lining up with pointer on timing gear case cover.

Spark Plugs

Standard equipment Champion C-15. Proper gap is .025 in.

Valves

Intake valve head diameter $1\frac{21}{32}$ in. Exhaust valve head diameter $1\frac{17}{32}$ in. Intake and exhaust valve seat angle 45 deg. Operating tappet clearance, intake .008 in., exhaust .008 in.



Valve Timing

When installing timing chain or sprockets, punch marks on sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, anodized. Remove from above. Pistons stamped with trade mark, and should be installed with trade mark toward front of engine. Piston pin diameter $\frac{7}{8}$ in., float in rod and piston.

Connecting Rods

Remove from above. Bearings are steel-backed babbitt-lined. Install with trade mark toward front of engine.

Battery

U.S.L. Capacity 120 amp. hr. Positive terminal grounded.

Generator

Auto-lite, GAR 4601-5. Adjustable third brush type. Maximum output 18 amps. with generator hot. If generator fails to charge, check $7\frac{1}{2}$ amp. field fuse located under small cover ahead of brush cover band. To increase charging rate, shift third brush in direction of armature rotation.

Starter

Auto-lite, MAD 4076. Drive through Bendix gear.

Brakes

Bendix, hydraulically operated, with mechanically operated hand brake of rear wheels for parking. Brake drum diameter 10 in. Brake lining per wheel, 22 in. x 2 in. x $\frac{5}{32}$ in. To adjust, jack up all four wheels, loosen eccentric lock

nut and turn eccentric in direction of forward wheel rotation until .010 in. feeler gage is snug at top and bottom of secondary (rear) shoe. Tighten eccentric lock nut, and expand notched adjusting wheel until heavy drag is felt on drum, then back off adjusting wheel until drums are free of drag.

To adjust hand brake, expand shoes in drums by turning notched adjusting wheel until shoes are tight in drums. Loosen hand brake bracket-to-frame screws and pull hand brake into third notch from rear of sector. Shift the bracket forward until the cables are tight, and then tighten frame screws securely. Release hand brake, and check adjustment of rear wheel shoes as outlined above.

Steering

Gemmer worm and roller type. To remove worm shaft end play, disconnect drag link from pitman arm. Turn steering wheel about one turn to right from straight ahead position, loosen lower housing cover screws and remove one shim at a time, tightening cover screws after each shim is removed and check for stiffness by turning steering wheel. To remove roller shaft end play, turn steering wheel to extreme left or right and then turn it back $\frac{1}{4}$ of a turn. Loosen adjusting screw lock nut on engine side of steering housing and turn in on adjusting screw until end play is removed. To remove backlash between worm and roller it is necessary to remove steering shaft housing from car. Remove roller shaft from housing and remove one shim at a time. Temporarily reinsert shaft and hold in place with thumb while turning steering wheel to center position. Then grip the splined end of the shaft and try to rotate it, observing backlash. When all backlash is removed with roller in center of worm, reinstall in housing and re-install housing in car.

Front Axle

"I" beam type. Caster 2 to 4 deg. Chamber 0 to $1\frac{1}{2}$ deg. Toe-in $\frac{1}{8}$ in. King pin inclination 7 deg.

Rear Axle

Semi-floating type. Pinion shaft adjustment is by means of shims between inner bearing cup and housing. Axle shaft end play adjusted by shims under brake support plates.

Lubrication

Engine crankcase capacity 7 quarts. Use S. A. E. 30 in summer, S. A. E. 20-W in winter. Transmission capacity 3 pints. Use S. A. E. 90 Extreme Pressure in summer and winter. Rear axle capacity 3 pints. Use S. A. E. 90 Extreme Pressure in summer and winter.



LINCOLN

Zephyr Model H-901

Engine

Twelve cylinder, 75 deg. V type, 2 3/4 x 3 3/4 in. Firing order 1-4-9-8-5-2-11-10-3-6-7-12. (Left cylinder bank odd numbers, right bank even numbers.) Compression ratio 6.7 to 1. Compression pressure 105 lb. at cranking speed.

Carburetor

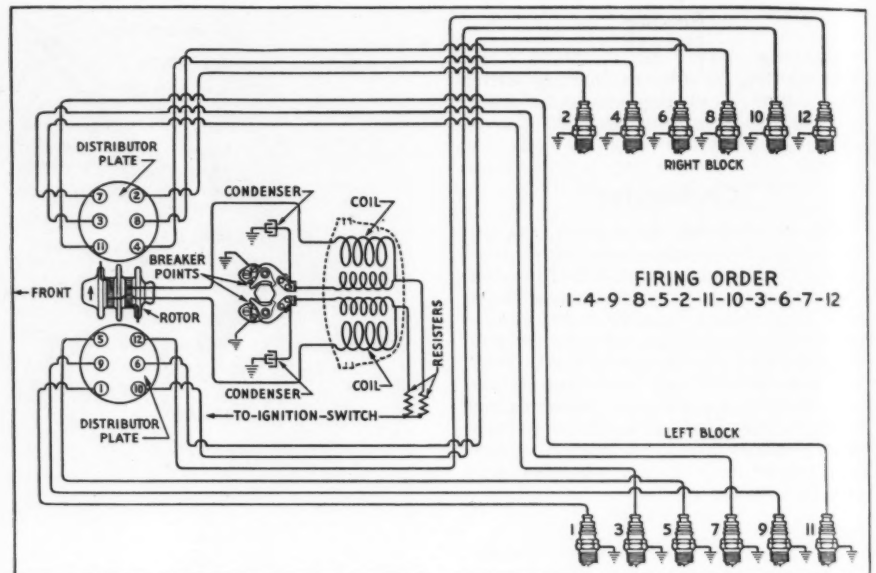
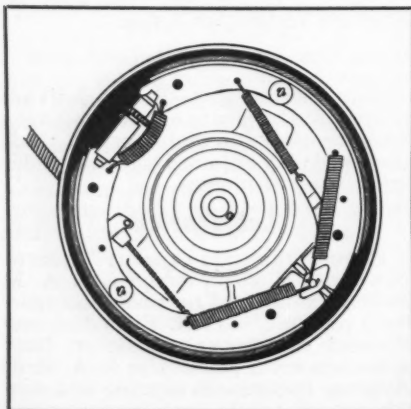
Stromberg EE-1, dual downdraft, 1 in. Idle adjustment—turn adjusting screw OUT for richer mixture, IN for lean. Separate idle adjusting screw for each barrel of carburetor. Main jets are fixed type, and cover all intermediate speeds. Calibration—venturi 31/32 in. High-speed bleeder No. 65. Main discharge jet No. 32-36. Main metering jet .046 in. By-pass jet No. 60. Idle air bleed No. 40. Pump discharge nozzle No. 60. Fuel level 15/32 in. below top of float chamber.

Distributor

Own design, double breaker type, automatic advance with vacuum control. Advance starts at 450 to 500 r.p.m., reaching maximum of 20 deg. at 3000 r.p.m. Breaker arm spring tension 20 to 24 oz. Breaker point gap .014 to .016 in.

Ignition Timing

Clean and adjust breaker points to .015 in. gap. Distributor can only be installed in correct position. Ignition occurs 4 deg. or 1 1/4 flywheel teeth before upper center. Stationary points fire left bank of cylinders and movable points fire right bank of cylinders. A slotted screw on right side of distributor permits a small range of advance and retard. Loosen screw and move plate upward to advance. Each graduation of scale on plate represents 2 deg. Removing screw and plate uncovers another screw for synchronizing movable points—turning screw in, advances points, while turning it out, retards points.



Spark Plugs

Standard equipment Champion 14 mm. No. J-9. Proper gap is .025 in.

Valve Timing

With valve tappet clearance set at .0125 to .0135 in., intake valve opens 19 1/2 deg. or 6 flywheel teeth before top center and exhaust valve closes 16 1/2 deg. or 5 1/4 flywheel teeth after top center.

Pistons

Thin-walled copper-steel alloy. Remove from above. Pistons fitted so that it should require a 5 lb. pull to withdraw a 1/2 in. feeler gage .002 in. thick from between piston and cylinder wall. Piston pin diameter 3/4 in. Pin floats in rod and piston, end play controlled by retainers in piston.

Main Bearings

Four, steel-backed, copper-lead material. Replaceable without removing crankshaft from engine. Crankshaft thrust taken by rear bearing. Crankshaft end play .002 to .006 in.

Battery

Own make, 17 plate, 96 amp. hr. capacity. Positive terminal grounded.

Generator

Air cooled with third brush regulation. To increase charging rate remove cover band and shift third brush in direction of armature rotation. Maximum charging rate is 18 amps. at 30 m.p.h.

Starter

Equipped with Bendix drive. Engine cranking speed 100 r.p.m. Cur-

rent to turn motor 225 amps. at 4.75 volts. Maximum torque 14 ft.-lbs.

Brakes

Two-shoe, mechanically operated, with hand brake operating on all four wheels. Diameter of brake drum 12 in. Molded lining used. Brake lining per wheel, 23.9 in. x 1 1/4 in. x .21 in. To adjust, jack up all four wheels, release hand brake and disconnect brake cables at cross shaft. Loosen eccentric lock nut and turn eccentric adjustment in direction of forward wheel rotation until a slight drag is felt, then back it off until wheel is free. Expand shoes by turning notched adjusting wheel until wheels can just be turned by hand. With shoes expanded, adjust cable lengths so that clevis pin will just enter clevis and cross shaft with all slack removed. Back off notched adjusting wheel until each wheel is free of brake drag.

Steering

Gemmer worm and roller type. An automatic adjustment is supplied for the worm shaft bearing, and should require no attention. Backlash between worm and roller is adjusted by removing pitman arm and then removing roller shaft from housing. Remove shims from roller shaft one at a time until backlash is eliminated, and then turn in on roller shaft adjusting screw to remove end play.

Front Axle

"I" beam, reverse Elliott type. Caster 7 deg. Camber 3/4 deg. Toe-in 1/16 to 1/8 in. King pin inclination 8 1/2 deg. Tread is 55 1/2 in.

N A S H

"400" & Amb. Model 3620



Engine

Starting Serial No. C-1001 Standard "400," C-9501 DeLuxe "400," R-303301 Ambassador Six "3620." Six-cylinder, 3 3/4 x 4 1/2 in. Firing order 1-5-3-6-2-4. Compression ratio Standard and DeLuxe "400," 5.61 to 1. Compression ratio Ambassador, 5.70 to 1. Compression pressure 100 lb. at cranking speed.

Carburetor

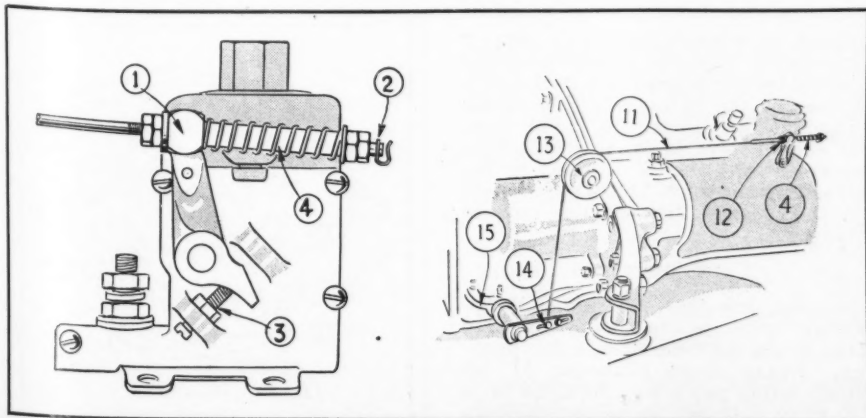
Stromberg EX-22, downdraft, 1 1/4 in. on "400" Series. Stromberg EX-32, downdraft, 1 1/2 in. on "3620" Series. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. Calibration of EX-22—venturi 1 5/32 in. High-speed bleeder No. 70. Main discharge jet No. 32. Main metering jet .057 in. By-pass jet No. 56. Idle air bleed No. 54. Pump discharge nozzle No. 64. Fuel level 5/8 in. below top of float chamber. Calibration of EX-32—venturi 1 3/16 in. High-speed bleeder No. 70. Main discharge jet No. 32. Main metering jet .064. By-pass jet No. 56. Idle air bleed No. 50. Pump discharge nozzle No. 67. Fuel level 5/8 in. below top of float chamber.

Distributor

Auto-lite IGB 4328, single breaker type on "400" Series. Auto-lite IGE 4012-B, double breaker type on "3620" Series, automatic advance. Breaker point gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020 in. gap. Set distributor so that No. 1 cylinder fires when "IGN" mark on front vibration dampener is directly under the pointer on timing case cover. On Ambassador models, loosen movable point plate screws and shift subplate so the movable or right-hand points are just ready to break.



Spark Plugs

Standard equipment A.C. 18 mm. type G-8 on "400" Series, and A.C. 14 mm. type K-12 on "3620" Series. Proper gap is .025 in.

Valves

Operating tappet clearance .015 in. hot.

Valve Timing

When installing new timing chain, punch marks on camshaft and crankshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, invar strut and split skirt. Remove from above. Fitted with .002 in. clearance on thrust side of piston. Install in engine with trade mark on piston toward front of engine. Piston pin diameter 7/8 in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Bearings are steel-backed babbitt lined, replaceable without removing rods from engine. Install with trade mark toward front of engine.

Battery

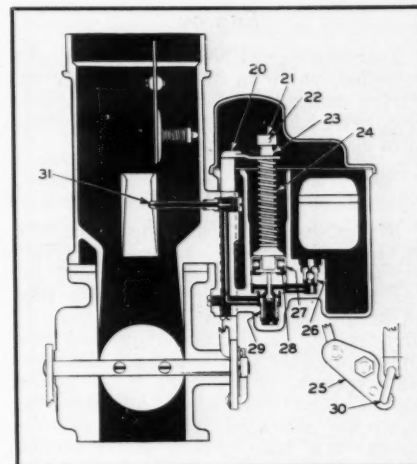
U.S.L. Capacity 115 amp. hr. Positive terminal grounded.

Generator

Auto-lite, GAR 4618-2 on "400," Auto-lite GAR 4601-5 on "3620." Adjustable third brush type, maximum output 18 amps. with generator hot. To increase charging rate, shift third brush in direction of armature rotation. If generator fails to charge, check 7 1/2-amp. fuse located under small cover ahead of brush cover band.

Starter

Auto-lite, MAB 4076 on "400," and



Auto-lite MAB 4077 on "3620," with Bendix drive. The coincidental starter switch is interconnected with the clutch pedal by cable "11." The adjustment of the cable should be examined after every clutch adjustment. The starter switch should engage just after the clutch pedal has been depressed enough to release completely the engine clutch. This can be determined by placing the car in gear and very slowly depressing the pedal. The cable is adjusted at the clamp "14." The lever "1" should have 1/8 in. relatively free movement, and this is obtained by the adjusting screw "3." The adjustment of the spring "4" should not be changed.

Brakes

Bendix, two-shoe, hydraulically operated, with mechanically operated hand brake on rear wheels for parking. Brake drum diameter, "400" Series, 10 in.; "3620" Series, 11 in. Brake lining per wheel, "400" Series, 22 in. x 2 in. x 5/32 in. Brake lining per wheel, "3620" Series, 24 in. x 1 3/4 in. x 5/32 in. To adjust, jack up all four wheels. Loosen eccentric lock nut and turn eccentric in direction of forward wheel rotation until a .010 in. feeler gage is just snug between lining of secondary (rear) shoe and drum. Tighten eccentric lock nut. Expand shoes with notched adjusting wheel until there is a heavy drag on brake drums, then back off until wheels are free.

Steering

Gemmer worm and roller. For adjusting instructions, see LaFayette Model 3610.

Front Axle

"I" beam type. Caster 2 1/2 deg. Camber 1 1/2 deg. Toe-in 1/8 in. King pin inclination 7 deg.



1936 NASH AMBASSADOR

N A S H

Amb. Super 8, Model 3680

Engine

Starting Serial No. B-77325. Eight cylinder, valve in head, $3\frac{1}{8}$ x $4\frac{1}{4}$ in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 5.25 to 1. Compression pressure 90 lbs. at cranking speed.

Carburetor

Stromberg EE-1, dual downdraft, 1 in. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. There is a separate idle adjusting screw for each barrel of carburetor. Main metering jets are non-adjustable and cover all intermediate speeds. Fuel level $\frac{1}{2}$ in. below top of float chamber. Accelerating pump is provided with two adjustments—use hole giving short stroke for summer and long stroke for winter. Calibration—venturi 1 $\frac{1}{32}$ in. High speed bleeder No. 70. Main discharge jet No. 32-36. Main metering jet .048 in. By-pass jet No. 63. Idle air bleed No. 54. Pump discharge nozzle No. 65.

Distributor

Auto-lite, IGB 4101. Double breaker type, with automatic advance. Breaker point gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020 in. gap. Turn motor until "IGN" mark on front vibration damper is directly under pointer on timing gear case cover. Loosen distributor clamp screw and shift distributor so the fixed or left-hand points are just ready to break, and tighten clamp screw. Loosen movable pointplate screws 2, 3 and 4, and shift subplate so the movable or right-hand points are just ready to break, and tighten plate screws.

Spark Plugs

Standard equipment is A. C. 14 mm. type K-12. Proper gap is .020 to .025 in.

Valves

Operating tappet clearance: Intake and exhaust .015 in., hot.

Valve Timing

When installing new timing chain, the punch marks on cam and crankshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, invar strut with split skirt. Remove from below. Fitted with .002 in. clearance. Install with trade mark on piston toward front of engine. Piston pin diameter $\frac{7}{8}$ in. Pin floats in rod and piston.

Connecting Rods

Remove from below. Bearings are steel-backed, babbitt lined, replaceable without removing rods from engine. Install rods with trade mark toward front of engine.

Battery

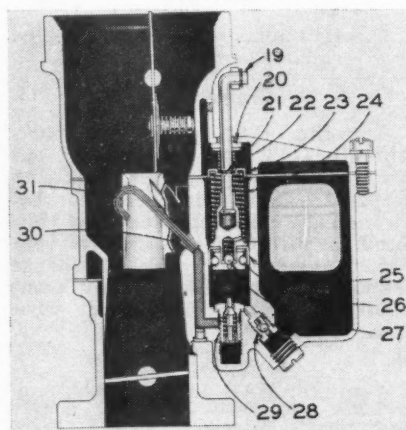
U.S.L. KW-15A. Capacity 133 amp. hrs. Positive terminal grounded.

Generator

Auto-lite, GAR 4601-5. Adjustable third brush type, maximum output 18 amps. with generator hot. If generator fails to charge, check $7\frac{1}{2}$ amp. fuse located under small cover ahead of brush cover band.

Starter

Auto-lite, MAB 4054. Drive through Bendix gear. Current draw with engine idling is 50 amps. at 6 volts. With armature locked, current draw is 165-170 amps. at 5 volts. The coincidental starter switch is interconnected with clutch pedal by a cable. The adjustment of the cable should be examined after every clutch adjustment. The starter switch should engage just after the clutch pedal has been depressed



enough to release completely the engine clutch. This can be determined by placing the car in gear and very slowly depressing the pedal. The cable is adjusted at the clamp "14." The lever "1" should have $\frac{1}{8}$ in. relatively free movement and this is obtained by the adjusting screw "3." The adjustment on the spring "4" should not be changed.

Brakes

Bendix, two-shoe, hydraulically operated, with mechanically operated hand brake on rear wheels for parking. Brake drum diameter 11 in. Brake lining per wheel, 23 $\frac{13}{16}$ in. x $2\frac{1}{4}$ in. x $\frac{3}{16}$ in. To adjust, jack up

all four wheels. Loosen eccentric lock nut and turn eccentric in direction of forward wheel rotation until a .010 in. feeler gage is snug between lining of secondary (rear) shoe and drum. Tighten lock nut. Expand shoes by turning notched adjusting wheel until heavy drag is felt on drums, then back off until wheel is free of drag. To adjust hand brake, expand rear wheel shoes until they are tight in drum. Loosen screws holding hand brake bracket to frame. Pull hand brake on three notches, and then move bracket forward until cables are tight. Tighten bracket screws and release hand brake. Recheck to be sure that shoes have .010 in. clearance between lining and drum.

Steering

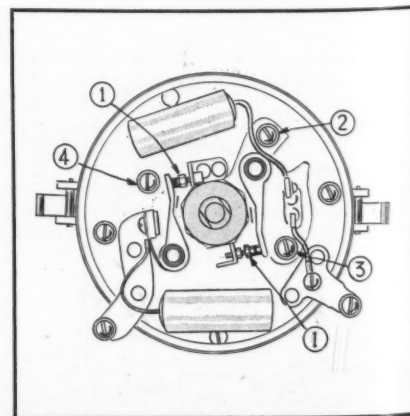
Gemmer worm and roller type. To adjust, jack up front wheels and turn steering wheel one turn to right from straight ahead position. To remove end play from steering column, loosen four worm cover screws and remove one shim. Tighten cover screws and check. If play still exists, remove another shim. To remove roller shaft end play, turn steering wheel to either extreme and then back $\frac{1}{8}$ turn. Loosen adjusting screw lock nut on inner end of shaft and turn screw right hand. Tighten lock nut. To remove backlash between worm and roller it is necessary to remove steering assembly from car. Remove roller shaft and remove shims as necessary until no backlash is present with roller in center of worm.

Front Axle

Reverse Elliott "I" beam. Caster $2\frac{1}{2}$ deg. Camber $1\frac{1}{2}$ deg. Toe-in $\frac{1}{8}$ in. King pin inclination 7 deg.

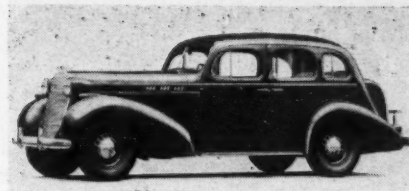
Rear Axle

Semi-floating. Gear ratio 4.1 to 1. Pinion adjustment is by means of shims. Backlash between ring gear and pinion .006 to .008 in.



OLDSMOBILE

Eight Model L-36



Engine

Starting No. L-202001, Serial No. L-100001. Eight-cylinder, 3 x 4 1/4 in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 6.2 to 1. Compression pressure 121 lb. at cranking speed.

Carburetor

Carter model WD-O dual down-draft, 1 in., with climatic control. Turn idle adjusting screw OUT for richer mixture, IN for lean. To adjust automatic throttle opening, disconnect starter cable from starter switch. Place .090-in. feeler gage between throttle lever adjusting screw and carburetor casting. Place starter shift lever in full down position and adjust throttle cross shaft lever by means of adjusting screw, so that it contacts the pin on starter shift lever. To adjust float level, remove air horn and float bowl cover assembly. With cover inverted, distance between the metal rim which holds the gasket and nearest point of float should be 3/16 in., measured on both sides of center seam. Calibration—metering rod .070-.065-.052 in. Metering rod jet No. 43 drill. Pump jet No. 72 drill. Idle by-pass No. 53 drill. Idle economizer .049 in. Low-speed jet No. 72 drill. Inlet needle seat No. 38 drill. Fuel supplied by A.C. pump.

Distributor

Delco-Remy Model 663-K, single breaker type, automatic with vacuum control. Breaker arm spring tension 19 to 23 oz. Adjust breaker points to .0125 to .0175-in. gap.

Ignition Timing

Clean and adjust breaker points to .015-in. gap. Loosen hold-down plate bolt on back of distributor and place arrow point in center position. Set ignition so that No. 6 cylinder fires when steel ball in flywheel lines up with pointer at timing hole in left

side of flywheel housing, which is .002 in. before top center.

Spark Plugs

Standard equipment A.C. 18 mm., type G-9. Gap is .030 to .033 in.

Valves

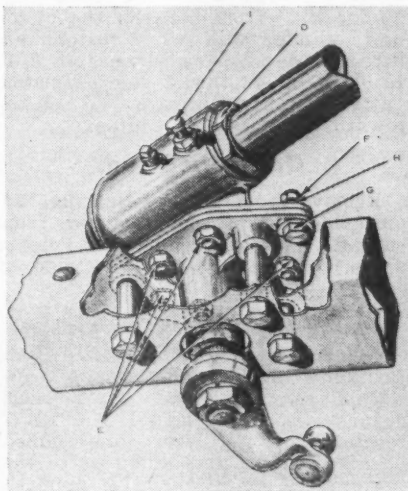
Operating valve tappet clearance, intake .008 in., exhaust .010 in.

Valve Timing

With intake and exhaust valves lashed at .010 in., intake valve opens at top center, and exhaust valve closes 10 deg. or 4 flywheel teeth after top center. When installing new timing chain, marks on camshaft and crankshaft sprockets should be brought together and in line with centers of the two shafts.

Pistons

Aluminum alloy, anodized. Removed from below. It should require 4 to 11 lb. to withdraw a .002-in. feeler gage 1/2 in. wide from between the piston and cylinder wall when pis-



tons are fitted to the proper clearance of .0013 to .0018 in. on thrust side of piston. Install with mark "VS" on top of piston toward valve side of engine. Piston pin diameter .8554 to .8557 in.

Connecting Rods

Remove from below. Steel-backed, babbitt-lined bearings, replaceable without removing rods from engine. Install rods with oil hole in upper bearing toward valve side of engine.

Generator

Delco-Remy Model 936-T, non-adjustable third brush. Output controlled by voltage regulator. To check

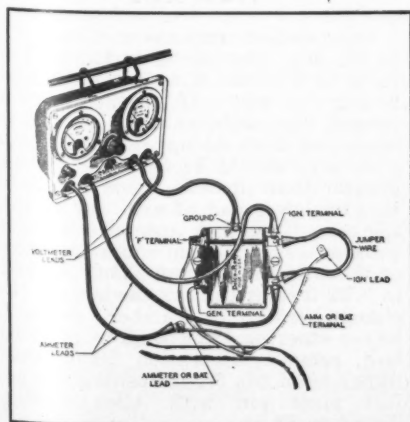
output, see instructions on Oldsmobile 6. To check voltage regulator, disconnect lead from "IGN" terminal of regulator and temporarily connect "IGN" terminal to "BAT" terminal by means of a jumper wire. Disconnect lead from "BAT" terminal and connect positive ammeter lead to "BAT" terminal. Connect negative ammeter lead to lead disconnected from "BAT" terminal. Connect positive voltmeter lead to "IGN" terminal and negative lead to ground. Temporarily ground "F" terminal of regulator and set engine speed for generator output of 15 to 17 amps. Remove "F" ground and adjust tester resistance until charge is 6 to 10 amps. At this output, voltage should be 7.4 to 7.6 volts with regulator hot. Adjust voltage by bending spring hanger to which the lower end of the spiral spring is attached. Increasing spring tension increases voltage. Point opening should be .015 to .025 in. Cutout relay point opening should be .016 to .022 in.

Steering

Saginaw worm and roller type. To remove end-play from sector shaft, loosen lock nut on inner end of shaft and turn screw right hand. To remove worm shaft end-play, loosen adjusting nut clamp bolt "I" and turn adjusting nut "D" downward as far as possible without stiffening the action of steering wheel while turning through entire range. To remove backlash between worm and roller, disconnect drag link and turn steering wheel so that pitman arm is straight up-and-down, and check to see that assembly mark on face of pitman arm boss lines up with assembly mark on end of shaft. Loosen five cover stud nuts "E" and eccentric lock nut "F" 1/4 turn. With one wrench on eccentric bolt "G" and one on eccentric sleeve "H," turn bolt clockwise and sleeve counter-clockwise in gradual stages, noting result by moving pitman arm at each step. Rotate steering wheel to see if there are any tight spots, and loosen adjustment so wheel can be turned through these spots without excessive binding. Tighten nuts and connect drag link.

Front Axle

Independent suspension. Caster 1 1/2 to 2 1/4 deg. Camber 1/8 to 1 deg. Toe-in 1/8 to 3/16 in. King pin inclination 5 deg. 51 min. When checking camber with a square, distance from square to felloe of the wheel at the top should be 1/32 to 9/32 in. less than at the bottom. To change caster or camber, or both, loosen steering knuckle support clamp bolt, remove lubrication fitting from upper pivot pin front bushing and adjust pivot pin with Allen wrench.





OLDSMOBILE

Six Model F-36

Engine

Starting number F-506001, serial number F-200001. Six cylinder 3 5/16 x 4 1/8 in. Firing order 1-5-3-6-2-4. Compression ratio 6.0 to 1. Compression pressure 111 lb. at cranking speed.

Carburetor

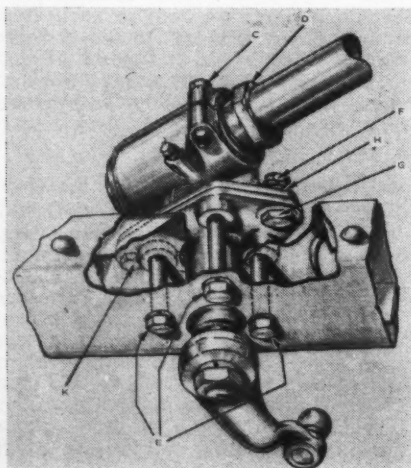
Carter Model 327S to Serial No. F-217745. Model 339S after Serial No. F-217745. Single downdraft, 1 1/4 in., with climatic control. Idle adjustment: turn adjusting screw OUT for rich mixture, IN for lean. If good idle is not obtained, remove adjusting screw and speed up motor to remove dirt accumulated around adjusting screw seat. Idle stop screw set for 6 m.p.h. To adjust automatic throttle opening see instructions for Olds 8. Accelerating pump provided with adjustable stroke. Use hole giving short stroke for summer and hole giving long stroke for winter. Lubricate countershaft operating pump every 5000 miles with graphite grease. To check float level remove float chamber cover and remove gasket. With cover inverted, float should measure 1/2 in. from nearest point to metal rim which holds gasket. Calibration—metering rod .070-.067-.040 in. Metering rod jet No. 40 drill. Pump jet No. 72 drill. Idle by-pass No. 58 drill. Idle economizer .051 in. Low speed jet No. 72 drill. Inlet needle seat No. 38 drill. Fuel supplied by A. C. pump.

Distributor

Delco-Remy Model 647-C, single breaker type, automatic with vacuum control. Breaker arm spring tension 17 to 21 oz. Adjust breaker points to .018 to .024 in. gap.

Ignition Timing

Clean and adjust breaker points to .020 in. gap. Loosen hold down plate bolt on back of distributor and place



arrow point in center position. Set ignition so that No. 1 cylinder fires when steel ball in flywheel lines up with pointer at timing hole in left side of flywheel housing, which is at top dead center.

Spark Plugs

Standard equipment A. C. 18 mm. type G-9. Gap is .030 to .033 in.

Valves

Operating valve tappet clearance, intake .008 in., exhaust .010 in.

Valve Timing

With intake and exhaust valves lashed at .010 in., intake valve opens 5 deg. or 2 flywheel teeth before top center, and exhaust valve closes 5 deg. or 2 flywheel teeth after top center. When installing new timing chain, marks on camshaft and crankshaft sprockets should be brought together and in line with shaft centers.

Pistons

Aluminum alloy, anodized. Remove from above. It should require 4 to 11 lb. to withdraw a .002 in. feeler gage 1/2 in. wide from between the piston and cylinder wall when pistons are fitted to the proper clearance of .0013 to .0018 in. on thrust side of piston. Install pistons with mark "VS" on top toward valve side of engine.

Connecting Rods

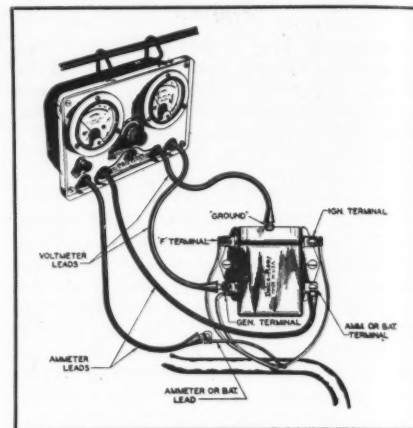
Remove from above. Bearings replaceable without removing rods from engine. Install rods with oil hole in upper bearing toward valve side of engine.

Generator

Delco-Remy Model 936-T, non-adjustable third brush. Output controlled by voltage regulator. To check output, disconnect lead from "BAT" terminal of regulator and connect positive lead of test ammeter to this terminal. Connect negative ammeter lead to lead disconnected from "BAT" regulator terminal. Connect positive voltmeter lead to "BAT" terminal of regulator and negative lead to ground. Ground "F" terminal of regulator. With engine speed 30 to 35 m.p.h., output should be 20 to 26 amps. at 8.2 to 8.8 volts. To test voltage regulator see instructions on Oldsmobile 8. Illustration above covers test of cut-out relay.

Starter

Delco-Remy 738-S. Drive through manually controlled overrunning clutch. Running free, current draw is 65 amps. at 5 volts and speed of 5000 r.p.m. With armature locked, current draw is 575 amps. at 3.0 volts, and develops 15 ft.lb. of torque. Flywheel has 145 teeth.



Steering

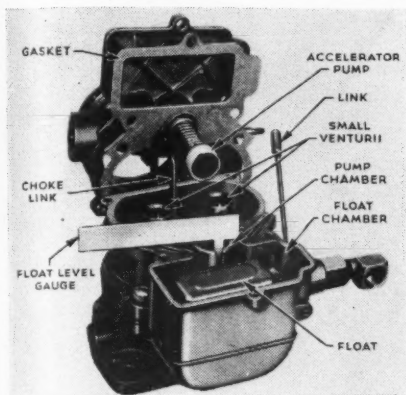
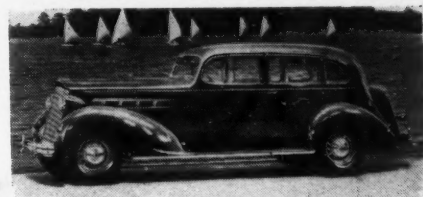
Saginaw worm and roller type. To remove end-play from sector shaft, loosen lock nut at inner end of roller cross shaft and turn screw right hand. To remove worm shaft end-play loosen housing clamp bolt "C" 1/2 turn and screw adjusting nut "D" on steering column down as far as possible without stiffening action of steering wheel while turning through its entire range. To remove backlash between worm and roller, disconnect drag link from pitman arm. Turn steering wheel so that pitman arm is in straight up-and-down position, and check to see that assembly marks on face of pitman arm boss and on end of shaft line up. Loosen three cover to frame screws "E" and pivot screw "K" and eccentric lock nut "F" one-quarter turn. With one wrench on eccentric bolt "G" and one on eccentric sleeve "H" turn the bolt in clockwise direction and sleeve in counter-clockwise direction in gradual stages, noting result by moving pitman arm at each step. When backlash is removed, check to see that steering wheel turns freely. Tighten screws and lock nut.

Front Axle

Independent suspension. Caster 1 1/2 to 2 1/4 deg. Camber 1/8 to 1 deg. Toe-in 1/8 to 3/16 in. King pin inclination 5 deg. 51 min. If checked with a square, the distance from square to machined boss on upper end of support arm should be 3/16 to 9/32 in. greater than distance from square to boss on lower end of arm, for correct caster. Checking camber with a square, distance from square to felloe of the wheel at the top should be 1/32 to 9/32 in. less than at the bottom. To change caster or camber, or both, loosen steering knuckle support clamp bolt, remove lubrication fitting from upper pivot pin front bushing and adjust pivot pin with Allen wrench. Tread in 58 in.

PACKARD

Model 36-120B



Engine

Starting Serial No. 992. Eight cylinder, $3\frac{1}{4} \times 4\frac{1}{4}$ in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 6.5 to 1. Compression pressure 110 lbs. at cranking speed.

Carburetor

Stromberg EE-14, dual downdraft, 1 in. There are two idle adjusting screws, one for each barrel of the carburetor. Idle adjustment—turn idle adjusting screws IN for lean mixture, OUT for rich. Fuel level $15/32$ in. below top of float bowl, with gasket removed. Calibration—venturi $1\frac{1}{32}$ in. Main metering jet .048 in. Main discharge jet No. 32-36. By-pass jet No. 60. High speed bleeder No. 65. Idle air bleed No. 50. Pump discharge jet No. 65. Automatic choke and fast idle mechanism built in. To adjust automatic choke, check all working parts for free operation, and adjust choke rod so that thermostat lever is $1/16$ in. from stop. Pointer of thermostatic spring plate should be at punch mark of graduation.

Distributor

Auto-lite, IGH 4026A, double breaker, full automatic type. Adjust breaker points to .020 in. gap.

Ignition Timing

Clean and adjust breaker points to .020 in. Set ignition so that No. 1 cylinder fires when white mark in scale on flywheel marked "No. 1 UP D C" lines up with pointer on left side of flywheel housing. This is 7 deg. or 2 flywheel teeth before upper dead center. Stationary points fire cylinders No. 1, 2, 8 and 7. Turn flywheel 90 deg. and adjust movable points plate so that cylinder No. 6 fires when white mark in scale on flywheel marked "No. 6 UP D C" lines up with pointer. Movable points fire cylinders No. 6, 5, 3 and 4.

Spark Plugs

Standard equipment A. C. 14 mm. type K-7 or Champion J-8. Proper gap is .029 in.

Valve Timing

Intake valve opens 7 deg. or 2 flywheel teeth before top center, and exhaust valve closes 5 deg. or 2 flywheel teeth after top center. When installing new timing chain, zero marks on camshaft and crankshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy strut type, removed from below. It should require a pull of from 5 to 7 lb. to withdraw feeler gage $\frac{1}{2}$ in. wide and .0015 in. thick from between piston and cylinder wall. Install pistons with slot away from valve side of engine.

Connecting Rods

Remove from below. Steel-backed babbitt-lined bearings, removable type. Install with oil hole toward camshaft side of engine.

Battery

Prest-o-lite HR 2-17. Capacity 114 amp. hr. Positive terminal grounded.

Generator

Auto-lite GBR 4601-5. Adjustable third brush type, with voltage regulator. Maximum charging rate, cold 23 amps., hot 20 amps. When battery is fully charged, voltage regulator inserts resistance in field circuit, lowering charging rate. If generator fails to charge, examine 5 amp. fuse in voltage regulator.

Starter

Auto-lite Max. 4006, with Bendix drive. Current draw, running free is

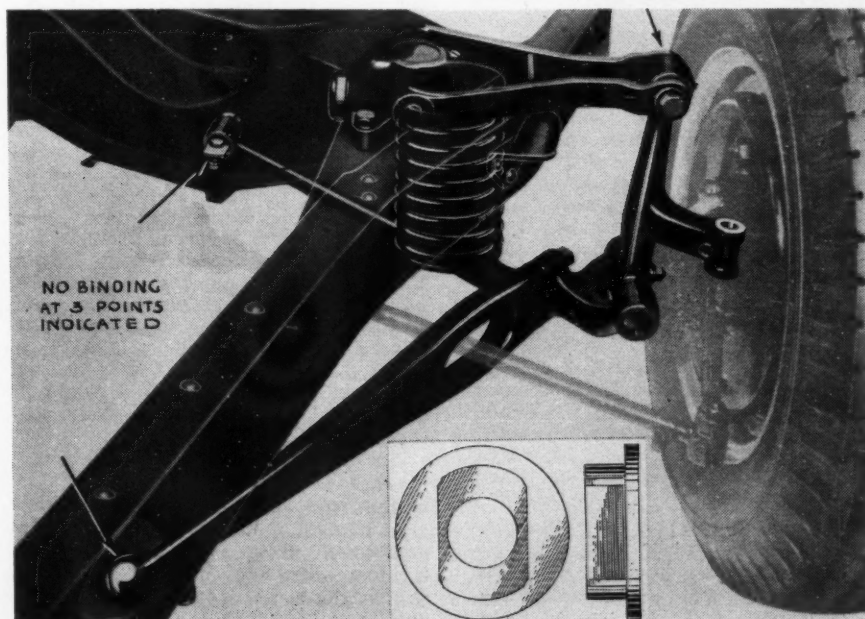
60 amps. at 6 volts and 3500 r.p.m. With armature locked, current draw is 750 amps. at 3.4 volts, developing 20 ft. lbs. of torque.

Steering

Own make, worm and roller type. To remove end play in worm shaft install shims between end cover plate and housing. To remove backlash between worm and roller, remove pitman arm, remove cross shaft cover and cross shaft. Remove one shim from between roller hub and housing. Reinstall roller shaft temporarily, and turn wheel to extreme left. With thumb pressing on head of roller shaft to hold it in place, turn steering wheel to right until roller is in center of worm. Still holding the roller shaft in place, grip the splined end with the other hand and try to rotate it. If play still exists, remove roller shaft and remove another shim. Continue until there is no play between worm and roller when roller is in center of worm. Then reinstall cover, and adjust roller shaft adjusting screw to remove end play.

Front Axle

Independent suspension. Caster 2 deg. Camber 1 deg. Toe-in $1/16$ to $1/8$ in. King pin inclination 1 deg. 30 min. To adjust caster, remove torque arm and install wedge-shaped shims on studs holding torque arm to frame. To adjust camber remove shock absorber link bolt and pilot and install pilot with center hole offset. To adjust toe-in, loosen tie rod socket clamp bolts and turn both tie rods an equal amount. Tread is 59 in.





PIERCE-ARROW

M o d e l 1 6 0 1

Engine

Starting Serial No. 2215001, 139 in. wheelbase, Serial No. 2600001, 144 in. wheelbase. Eight cylinder $3\frac{1}{2} \times 5$ in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 6.4 to 1. Compression pressure 80 lbs. at cranking speed.

Carburetor

Stromberg EE-3, dual downdraft, $1\frac{1}{2}$ in., with automatic choke. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. There is a separate idle adjusting screw for each barrel of the carburetor. Fuel level is $9/16$ in. below top of float chamber. Calibration—venturi $1\frac{3}{16}$ in. High speed bleeder No. 70. Main discharge jet No. 28. Main metering jet .060 in. By-pass jet .060 in. Idle air bleed No. 41. Pump discharge nozzle No. 72.

Distributor

Delco-Remy 662-J. Double breaker type, automatic advance with manual retard control. Breaker point gap is .018 in.

Ignition Timing

Clean and adjust breaker points to .018 in. gap. Set distributor so that No. 1 cylinder fires when "IGN 1-8" mark on flywheel is in line with pointer on right side of flywheel housing, which is 2 deg. or $\frac{1}{2}$ flywheel tooth before top center. Set movable points so that No. 4 cylinder fires when "IGN 4-5" mark on flywheel is in line with pointer on flywheel housing.

Spark Plugs

Standard equipment Champion 14 mm. type U-6. Proper gap is .022 to .025 in.

Valves

Intake valve head diameter $1\frac{9}{16}$ in. Exhaust valve head diameter $1\frac{9}{16}$ in. Valve stem diameter .372 in. Intake and exhaust valve seat angle 45 deg. Valve spring length, valve closed $2\frac{3}{32}$ in. at 60 lb. pressure. Valve spring length, valve open, $1\frac{25}{32}$ in. at 124 lb. pressure. Operating valve tappet clearance is automatically adjusted.

Valve Timing

Remove first tappet cluster, drain oil from lifters, and reinstall cluster. With .060 in. feeler gage between tappet and valve stem, intake valve opens 5 deg. or $1\frac{1}{2}$ flywheel teeth after top center and exhaust valve closes 12 deg. or $3\frac{1}{2}$ flywheel teeth after top center.

Pistons

Aluminum alloy, invar strut. Remove from above. Fitted with .002 in. clearance at 90 deg. angle from

piston pin boss. Piston pin diameter $\frac{7}{8}$ in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Bearings are spun babbitt, and are not adjustable.

Main Bearings

Nine, bronze-backed babbitt-lined. Replaceable without removing crankshaft from engine. Thrust taken by front bearing. Bearings fitted with .0015 to .003 in. clearance. Crankshaft end thrust .002 to .004 in.

Battery

Willard, 17 plate, 140 amp. hr. capacity. Positive terminal grounded

Generator

Owen-Dyneto. Maximum output with generator cold is 32 amps. With generator hot, maximum output is 28 amps.

Starter

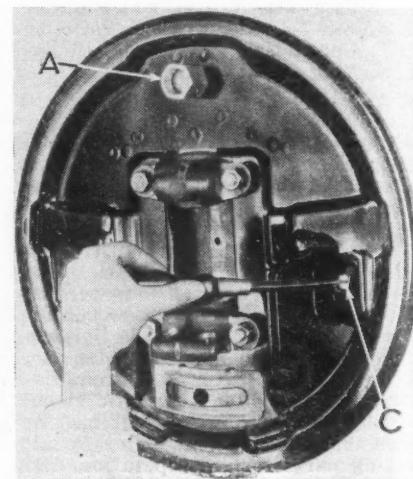
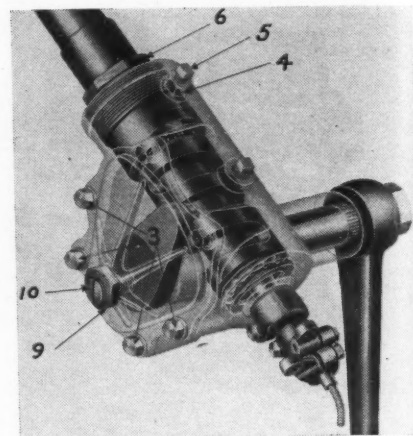
Owen-Dyneto. Drive through Bendix gear, with Startix control. Running free, current draw is 165 amps. at 5 volts and speed of 1600 r.p.m. With armature locked, current draw is 700 amps. at 3.8 volts, developing 25 ft. lbs. of torque. Flywheel has 116 teeth.

Brakes

Stewart-Warner, mechanical, with B. K. air suspended type vacuum booster. Hand brake operates service brakes on all four wheels. Brake drum diameter 16 in. Brake lining per wheel, 38 in. \times $2\frac{1}{4}$ in. \times $\frac{1}{4}$ in. To adjust, jack up all four wheels. Tighten the large hexagon adjusting nut "A" located at top of the brake backing plate, until the wheels cannot be revolved. Then back off the adjusting nut 10 notches or clicks. If the wheels do not revolve freely after backing off the adjusting nut, use a screw driver to turn the adjusting screw "C" on the backing plate, located at the rear of the axle on the front brakes and below the axle on the rear brakes. Turn adjusting screw right or left, as required, until the wheels revolve freely. The B. K. vacuum booster requires no attention except lubrication. At 10,000 mile intervals one ounce of Bendix vacuum cylinder oil should be injected into the felt retainer end of the brake cylinder, and a few drops of oil applied to the plunger of the external coupling valve.

Steering

Ross cam and lever. To adjust column end play, loosen lock screw "5" and cover plate screws "3," and tighten adjusting nut "6" until a slight drag is felt when turning wheel, and then back it off about $1/6$ of a



turn. Tighten lock screw and cover plate screws. To remove end play in pitman shaft, remove all but two diagonally opposite cover screws "3," and turn steering wheel to either extreme right or left. Then remove the two cover screws, and remove one .003 in. shim. Reinstall cover, holding it in place with two diagonally opposite screws, and check for lash by turning steering wheel from right to left extreme. Some backlash should be present at all points except mid position, where only a slight drag should be felt. When this is obtained, reinstall cover plate screws and tighten.

Front Axle

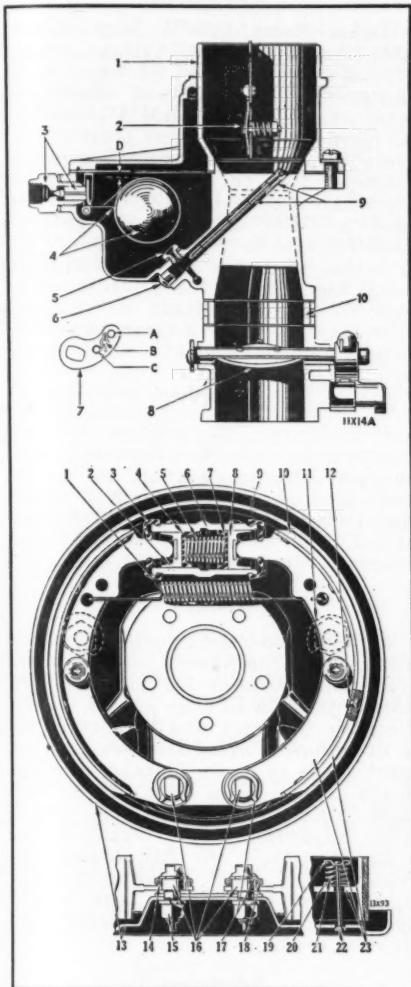
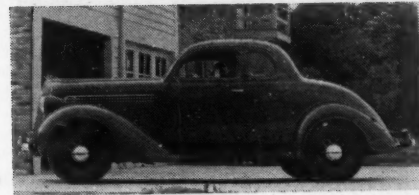
Reverse Elliott "T" beam type. Caster $\frac{3}{4}$ deg. Camber 1 deg. Toe-in $\frac{1}{4}$ in. King pin inclination 8 deg.

Rear Axle

Semi-floating. Gear ratio 4.58 to 1. Pinion adjustment is by means of a screw. Backlash between ring gear and pinion .002 to .003 in.

PLYMOUTH

Model P1 & P2



Engine

Starting Serial No. 1,111,701. Six cylinder, $3\frac{1}{8}$ x 4 in. Firing order 1-5-3-6-2-4. Compression ratio 6.70 to 1.

Carburetor

Carter Model C6E1, single down-draft, $1\frac{1}{4}$ in. Idle adjustment—turn idle adjusting screw IN for lean mixture, OUT for rich. Float level $5/64$ in. below top edge of float bowl. Calibration—main venturi $1\frac{1}{4}$ in. Idle air bleed .063 in. Main metering jet calibrated to flow 262 to 266 CC per minute. May be replaced with leaner than standard for altitude or high test fuel. Accelerating pump provided with three adjustments—use inner hole giving short stroke for summer, center hole for normal temperature and outer hole giving long stroke for winter.

Distributor

Auto-lite IGS 4003 A-1. Single breaker type, automatic advance with

vacuum control. Breaker arm spring tension 9 to 13 oz. Breaker point gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020 in. gap. Set ignition so that No. 1 cylinder fires 4 deg. or $1\frac{1}{2}$ flywheel teeth after top center, as indicated by timing marks on fan drive pulley.

Spark Plugs

Standard equipment A. C. 14 mm., type K-9. Proper gap is .025 in.

Valves

Operating tappet clearance, intake, .006 in.; exhaust, .008 in. hot.

Valve Timing

With intake valves lashed to .011 in. clearance and exhaust valves to .012 in. clearance, intake valve opens 6 deg. or $2\frac{1}{2}$ flywheel teeth after top center and exhaust valve closes 8 deg. or $3\frac{1}{3}$ flywheel teeth after top center. When installing timing chain, zero marks on crankshaft and camshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, anodized. Remove from above. Fitted with .0005 to .001 in. clearance on thrust side of piston. Piston pin diameter $55/64$ in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Bearings are removable, steel-backed babbitt lined. Install in engine with oil hole in upper half of bearing toward valve side of engine.

Battery

Willard, 13 plate 86 amp. hr. capacity. Positive terminal grounded.

Generator

Auto-lite CBM 4603 B-1 for Series P1, Auto-lite GAR 4608 F-5 for Series P2. Adjustable third brush type, with voltage regulator as optional equipment. To check output with voltage regulator equipment it is necessary to connect a jumper wire from the fuse cup or the relay terminal marked "F" to ground. Moving third brush closer to nearest main brush increases charging rate. Maximum output 14 to 17 amps. without regulator, 21 amps. with regulator.

Starter

Auto-lite MAW 4009. Drive through manually operated overrunning clutch. Flywheel has 146 teeth.

Clutch

Borg & Beck single plate, dry disk type. Adjust clutch pedal to provide

$1\frac{1}{16}$ in. free travel, measured at pedal pad.

Brakes

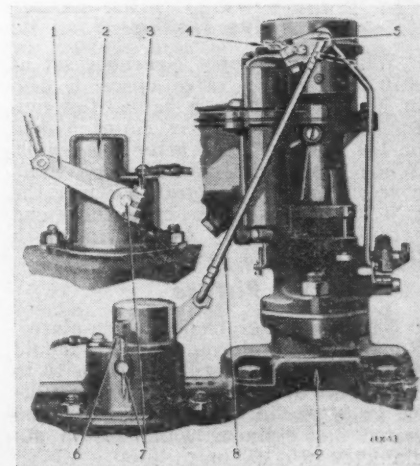
Lockheed hydraulic, with mechanical operation of hand brake on drive-shaft for parking. Brake drum diameter 10 in. Lining per wheel 19 13/16 in. x 2 in. x 13/64 in. Each brake is provided with two adjustments, one for each shoe. To adjust, turn brake shoe cam adjusting nut on inside of brake support until the front shoe lining is solid against the drum and the wheel is locked, then back off until the wheel is free. Set cam on rear shoe out at top until wheel is locked, then back off until wheel is free. Set brake pedal to provide $\frac{1}{2}$ in. free travel, measured at pedal pad.

Steering

Gemmer worm and roller type. To adjust, jack up the front wheels and turn the steering wheel one turn to the right from straight ahead driving position. To remove end play from steering column, loosen four worm cover screws and carefully remove top shim. Tighten four cover screws and check for stiffness. If end play still exists remove another shim. Next, remove drag link from pitman arm. To remove end play in steering cross-shaft, loosen lock nut and turn in on adjusting screw at inner end of cross-shaft. After tightening lock nut, rotate steering wheel throughout its travel to make sure there is no bind. Adjustment for closer mesh of the roller with the worm is accomplished by the removal of shims which are in place behind the roller-shaft thrust washer.

Front Axle

I-Beam type. Caster 2 deg. Camber $\frac{1}{2}$ deg. Toe-in $\frac{1}{8}$ in. King pin inclination $9\frac{1}{2}$ deg.





PONTIAC

DeLuxe Six Model 36-26A

Engine

Starting engine No. 84001. Serial No. 1001. Six cylinder 3 $\frac{3}{8}$ x 3 $\frac{3}{8}$ in. Firing order 1-5-3-6-2-4. Compression ratio 6.2 to 1. Compression pressure 149 lb. at cranking speed.

Carburetor

Carter Model 324S. Single down-draft 1 $\frac{1}{4}$ in. Idle adjustment—turn screw IN for lean mixture, OUT for rich mixture. Correct setting $\frac{1}{2}$ to 1 full turn open. To check float level remove bowl cover and gasket. With cover inverted, float should measure $\frac{3}{8}$ in. from nearest point to rim of cover. Calibration—primary venturi 11/32 in. Secondary venturi 11/16 in. Main venturi 1 $\frac{1}{4}$ in. Metering rod No. 75-125. Metering rod jet No. 44 drill. Accelerating pump jet No. 72 drill. Idle discharge jet No. 70 drill. Idle by-pass jet No. 55 drill. Idle economizer No. 48 drill. Automatic choke or climatic control built in. Correct setting of housing is one notch lean. Fuel supplied carburetor by A.C. pump.

Distributor

Delco-Remy 647B, single breaker type, automatic advance with vacuum control. Breaker arm spring tension is 17 to 21 oz. Point gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020 in. Set ignition so that No. 1 cylinder fires when lower line of "IGN 1 & 6" mark on flywheel lines up with pointer on left side of flywheel housing. This is 6 deg. or 2 flywheel teeth before top center.

Spark Plugs

Standard equipment A.C. 14 mm. type K-7. Proper gap is .025 in. Cars using radio, gap .022 in.

Valves

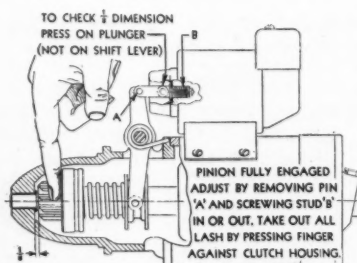
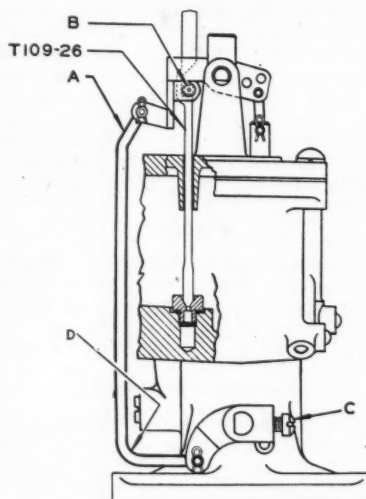
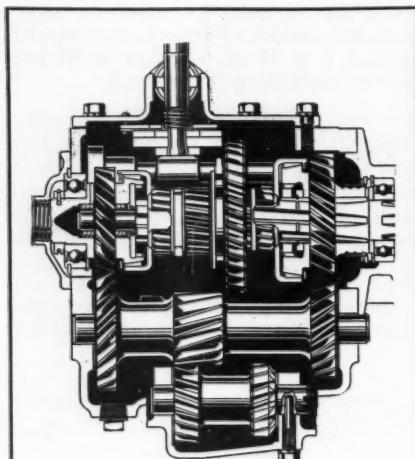
Operating tappet clearance .009 to .011 in.

Valve Timing

With valve tappet clearance set at .010 in., intake valve opens 5 deg or 1 $\frac{1}{2}$ flywheel teeth before top center, and exhaust valve closes 5 deg. or 1 $\frac{1}{2}$ flywheel teeth after top center. When installing new timing chain, correct timing is obtained when the two "O" marks on the crankshaft and camshaft sprockets are in line with the centers of the two shafts.

Pistons

Chrome nickel iron, electro-plated. Remove from above. Pistons should be fitted so that it will require a 10 to 25 lb. pull to withdraw a .002 in. feeler gage $\frac{1}{2}$ in. wide from between piston and cylinder wall. Piston pin diameter 15/16 in.



Connecting Rods

Remove from above. Steel-backed cadmium-silver alloy, replaceable without removing rods from engine.

Battery

Delco-Remy, 94 amp. hr. capacity. Negative terminal grounded.

Generator

Delco-Remy 935-W. Non-adjustable third brush, with voltage regulator. Maximum output 24 amps. at 38 m.p.h. To check output, disconnect wire at "BAT" or "AMM" terminal of regulator and connect positive ammeter lead to this terminal, negative ammeter lead to wire removed from terminal. Connect positive voltmeter lead to "GEN" terminal of regulator, negative lead to ground. Ground "F" terminal of regulator. If voltmeter reads less than 8.5 volts, adjust resistance in tester to obtain this reading with engine speed approximately 30 m.p.h., ammeter should read 20 amps. or more.

Starter

Delco-Remy 727Y, drive through overrunning clutch. Running free, current draw is 65 amps. at 5 volts and speed of 5500 r.p.m. With armature locked, current draw is 600 amps. at 3.0 volts, developing 15 ft. lbs. of torque. Flywheel has 139 teeth.

Brakes

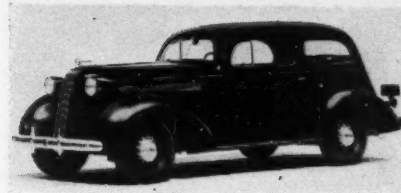
Bendix Duo-Servo, hydraulic operation, with mechanical operation of rear wheel brakes for parking. To adjust, jack up all four wheels. Loosen eccentric lock nut and turn eccentric in direction of wheel forward rotation until there is a considerable drag on brake drum. Then back off eccentric until brake is free. Expand shoes with adjusting wheel until brakes drag, then back off until brakes are free. Apply hand brake and check equalization by turning rear wheels by hand. To equalize, loosen the tightest brake.

Steering

Saginaw worm and roller type. To adjust, disconnect steering connecting rod at pitman arm, loosen three housing-to-frame mounting bolts, loosen roller shaft adjusting screw lock nut and back off adjusting screw $\frac{1}{2}$ turn. To remove worm shaft end play, loosen housing clamp bolt one turn and screw the adjusting nut down until slight load is felt when turning wheel to extreme positions. To remove backlash between worm and roller, center the steering wheel, loosen eccentric lock nut and with one wrench on the eccentric bolt and another on the eccentric sleeve, turn the bolt in a clockwise direction and the sleeve in a counter-clockwise direction at the same time and by gradual stages, noting result by shaking Pitman arm. To remove roller shaft end play, turn adjusting screw right hand snugly and then back it off until free, then tighten again until contact is made with shaft. Tighten lock nut, tighten housing-to-frame mounting bolts and reconnect steering connecting rod.

PONTIAC

Eight Model 36-28



Engine

Starting No. 44001, Serial No. 1001. Eight cylinder, $3\frac{1}{4} \times 3\frac{1}{2}$ in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 6.2 to 1. Compression pressure 144 lbs. at cranking speed.

Carburetor

Carter model 322S, single down-draft, $1\frac{1}{4}$ in. Idle adjustment—turn needle valve IN for lean mixture, OUT for rich mixture. Correct setting $\frac{1}{2}$ to 1 full turn open. For float setting see Pontiac Six. Calibration—primary venturi 11/32 in. Secondary venturi 11/16 in. Main venturi $1\frac{1}{4}$ in. Metering rod No. 75-160. Metering rod jet .085 in. drill. Accelerating pump jet No. 72 drill. Idle discharge jet No. 70 drill. Idle bypass jet No. 55 drill. Idle economizer No. 48 drill. Automatic choke or climatic control built in. Correct setting of housing is one notch lean. Fuel supplied carburetor by A. C. pump.

Distributor

Delco-Remy 663-H, single breaker type, automatic advance with vacuum control. Breaker arm spring tension is 19 to 23 oz. Proper gap is .018 in.

Ignition Timing

Clean and adjust breaker points to .018 in. gap. Set ignition so that No. 1 cylinder fires when the lower line of the "IGN 1 & 8" mark on flywheel is directly under the pointer on the left side of the flywheel housing. This is 6 deg. or 2 flywheel teeth before top center.

Spark Plugs

Standard equipment A. C. 14 mm. type K-7. Proper gap is .025 in.

Valves

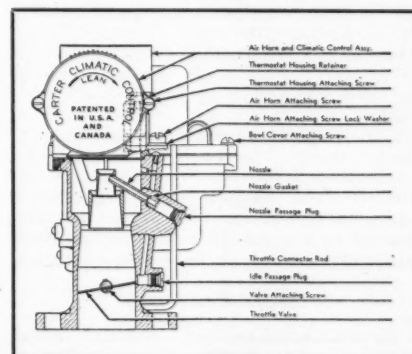
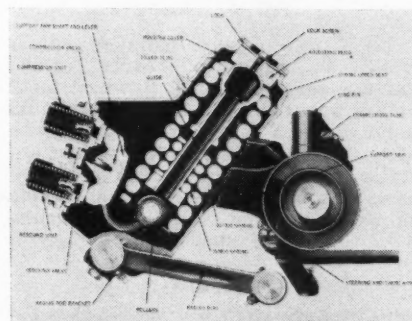
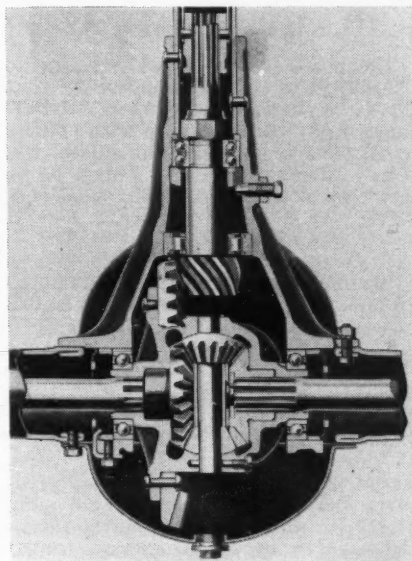
Operating tappet clearance, .010 in. hot.

Valve Timing

With intake and exhaust valve tappets set to .010 in., intake valve opens 5 deg. or 2 flywheel teeth before top center, and exhaust valve closes 5 deg. or 2 flywheel teeth after top center. When installing new timing chain or gears, zero marks on gears should be brought together and in line with centers of shafts.

Pistons

Chrome nickel iron, electro-plated. Remove from above. Pistons should be fitted so that it will require a 10 to 25 lb. pull to withdraw a .002 in. feeler gage $\frac{1}{2}$ in. wide from between piston and cylinder wall. Piston pin diameter 15/16 in. Pin locked in piston.



Connecting Rods

Remove from above. Bearings are steel-backed, cadmium-silver alloy, replaceable without removing rods from engine. Rods are offset, and should be installed with narrow side of offset toward nearest main bearing.

Battery

Delco-Remy, 107 amp. hr. capacity. Negative terminal grounded.

Generator

Delco-Remy model 935-W. Non-adjustable third brush, with voltage regulator. To check and adjust regulator, disconnect the leads from the "IGN" and "BAT" terminals of regulator, and with a jumper wire connect the "IGN" terminal to the "BAT" terminal. Connect the voltmeter positive lead to the "IGN" terminal of the regulator, and the negative lead to ground. Connect the ammeter positive lead to the "BAT" terminal and the negative lead to the wire disconnected from the "BAT" terminal. Set engine speed to 30 m.p.h. and adjust resistance in tester to show charging rate of from 8 to 10 amps. If the generator is hot the voltage should be 7.45 to 7.55 volts. If the voltage is too high or too low it may be changed by removing the regulator cover and bending the lower lip holding the coil spring in back of the coil armature. Bending lip down increases voltage and bending it up decreases voltage.

Starter

Delco-Remy model 727S, drive through solenoid-operated over-running clutch. Running free, current draw is 65 amps. at 5 volts and speed of 5500 r.p.m. With armature locked, current draw is 600 amps. at 3.0 volts, developing 15 ft. lbs. of torque. Flywheel has 139 teeth.

Steering

Saginaw worm and roller type. To adjust, disconnect steering connecting rod at Pitman arm, loosen three housing-to-frame bolts, loosen roller shaft adjusting screw lock nut and back off adjusting screw $\frac{1}{2}$ turn. To remove worm shaft end play, loosen housing clamp bolt one turn and screw the adjusting nut down until slight load is felt when turning wheel to extreme positions. To remove backlash between worm and roller, center the steering wheel, loosen eccentric lock nut and with one wrench on the eccentric bolt and another on the eccentric sleeve, turn the bolt in a clockwise direction and the sleeve in a counter-clockwise direction at the same time and by gradual stages, noting result by shaking Pitman arm. To remove roller shaft end play, turn adjusting screw right hand snugly and then back it off until free, then tighten again until contact is made with shaft. Tighten lock nut, tighten housing-to-frame mounting bolts and connect steering connecting rod.

Front Axle

Independent wheel suspension. Caster, zero; camber, minus $\frac{1}{4}$ deg. to plus $\frac{1}{4}$ deg.; king pin inclination $8\frac{3}{4}$ deg.; toe-in, zero to 1/16 in.



REO

Flying Cloud

Engine

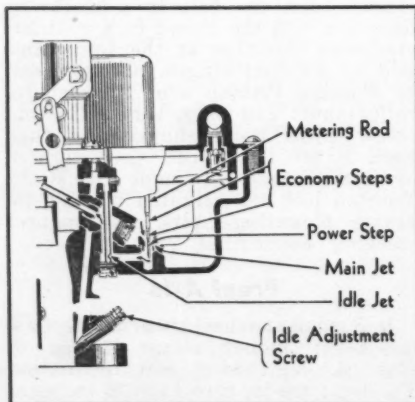
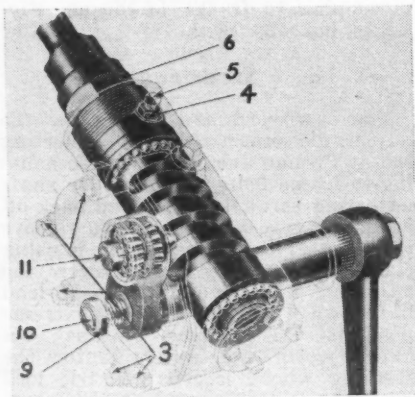
Six cylinder, 3% x 4 1/4 in. Firing order 1-5-3-6-2-4. Compression ratio 6.5 to 1. Compression pressure 85 lb. at cranking speed.

Carburetor

Carter W1-338S, down-draft, 1 1/4 in. Idle adjustment—turn idle adjusting screw IN for lean mixture, OUT for rich. Standard setting is 1/2 to 1 1/4 turns open. Float level 7/16 in. from top of float to float chamber cover, with cover inverted and needle valve seated. Calibration—primary venturi 11/32 in. Idle tube jet No. 70 drill. Idle air bleed No. 52 drill. Accelerating pump discharge jet No. 72 drill. Accelerating pump discharge nozzle No. 31 drill. Metering rod .077-.067-.043 in. Metering rod jet No. 38 drill. Accelerating pump is provided with three adjustments—use hole giving long stroke for winter, medium stroke for normal temperatures and short stroke for summer. Automatic choke with climatic control built in.

Distributor

Delco-Remy 623-D. Single breaker type, with automatic advance. Breaker point gap is .020 in.



Ignition Timing

Clean and adjust breaker points to .020-in. gap. Set distributor so that No. 1 cylinder fires when "UDC" mark on flywheel lines up with pointer at inspection hole in right side of flywheel housing, which is 2 deg. or 3/4 flywheel tooth before upper dead center.

Spark Plugs

Standard equipment is Champion 18 mm. type C-7A. Proper gap is .025 in.

Valves

Intake and exhaust valve head diameter, 1 13/16 in. Valve stem diameter, 11/32 in. Valve seat angle, 45 deg. Valve spring length, valve closed, 2 3/8 in. at 50 to 54 lbs. pressure. Valve spring length, valve open, 2 1/16 in. at 140 lbs. pressure. Operating valve tappet clearance, intake .007 in.; exhaust .008 in.

Valve Timing

With intake and exhaust valves lashed to .012-in. clearance, intake valve opens 5 deg. or 2 flywheel teeth before upper dead center, and exhaust valve closes 5 deg. or 2 flywheel teeth after upper dead center. When installing timing chain, punch marks on camshaft and crankshaft sprockets should be brought together and in line with centers of shafts.

Pistons

Aluminum alloy, T slot cam ground. Remove from above. Fitted with .0024 to .0032-in. clearance at point 90 deg. from piston pin boss. Install in engine with T slot away from valve side of engine. Piston pin diameter 63/64 in. Pin floats in rod and piston.

Connecting Rods

Remove from below. Bearings are steel-backed, babbitt-lined, replaceable without removing rods from engine. Install in engine with oil hole in upper bearing toward valve side of engine.

Main Bearings

Seven, steel-backed, babbitt lined, not adjustable. Fitted with .002 to .003 in. clearance. Crankshaft thrust taken by rear bearing. Crankshaft end play .003 to .007 in.

Clutch

Borg & Beck, single plate dry disk. Adjust clutch pedal to provide 1 in. free movement, measured at pedal pad.

Battery

Willard WH-1-13. 13-plate, 102 amp. hr. capacity. Negative terminal grounded.

Generator

Delco-Remy 937-Z. Adjustable third brush type. Maximum output, hot, is 15 to 17 amps. at 6 to 8 volts. To adjust charging rate, loosen clamping screw at the back of the housing and shift third brush as required.

Starter

Delco-Remy 738-K. Drive through Bendix gear. Starter button operated by clutch pedal. Running free, current draw is 65 amps. at 5 volts and speed of 5000 r.p.m. With armature locked, current draw is 475 amps. at 3.63 volts, developing 12 ft. lbs. of torque. Flywheel has 150 teeth.

Brakes

Lockheed hydraulic, with mechanical operation of hand brake on drive-shaft at the rear of the transmission. Diameter of brake drum 11 in. Brake lining per wheel, 28 3/4 in. x 1 1/4 in. x 1/4 in. To adjust, jack up all four wheels. Turn adjusting nut on front shoe toward the front until shoe drags against drum, then back it off until wheel is free. Turn corresponding adjusting nut on rear shoe toward the rear until shoe drags against drum, then back it off until wheel is free. Repeat on other three wheels.

Steering

Ross cam and lever. To adjust column up and down play, loosen lock screw "5" and pitman shaft adjusting screw "10." Turn down on adjusting nut "6" until there is a slight bind when turning steering wheel, then back off 1/6 of a turn, and tighten lock screw. To adjust pitman arm shaft end play, place front wheels in straight-ahead position and tighten adjusting screw "10" until a slight drag is felt when turning steering wheel through mid-position.

Front Axle

Reverse Elliott "I" beam. Caster 1 1/2 deg. Camber 1 1/2 deg. Toe-in 1/8 in. King pin inclination 8 deg.

Rear Axle

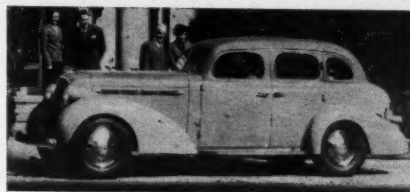
Semi-floating type. Gear ratio 4.27 to 1. Pinion adjustment is by means of shims. Backlash between ring gear and pinion is .006 to .008 in.

Lubrication

Engine crankcase capacity, 6 quarts. Use S.A.E. 30 in summer, S.A.E. 20-W in winter. Transmission capacity 3 1/2 pints. Use S.A.E. 160 in summer, S.A.E. 90 in winter. Rear axle capacity, 3 pints. Use S.A.E. 160 in summer, S.A.E. 90 in winter.

STUDEBAKER

President Eight



Engine

Starting Serial No. 7104001. Eight-cylinder 3 1/16 x 4 1/4 in. Firing order 1-6-2-5-8-3-7-4. Compression ratio 6.5 to 1. Compression pressure 105 lb. at cranking speed.

Carburetor

Stromberg model EE-1 dual down-draft, 1 in., with automatic choke. Separate idle adjustment for each barrel. Turning adjusting screw OUT gives richer mixture, IN gives leaner mixture. Main metering jets are non-adjustable, and cover all intermediate speeds. Calibration—venturi 1 1/32 in. Main discharge jet No. 32-36. High speed bleeder No. 70. Main metering jet .047 in. By-pass jet No. 63. Idle air bleed No. 44. Pump discharge nozzle No. 65. Float level 15/32 in. below top of float chamber. Rod connecting automatic choke lever with choke valve in carburetor should be adjusted so that choke valve will be fully closed when automatic choke lever is in uppermost position. The throttle stop screw should be adjusted for a car speed of 8 m.p.h. with the choke fully open. Notches on vertical link provide for fast idling during warm-up period. For correct setting the thermostat case should be rotated 16 graduations rich from the zero mark.

Distributor

Delco-Remy 936-X. Double breaker type, automatic advance with vacuum control. Adjust breaker points to .018 to .024-in. gap.

Ignition Timing

Clean and adjust breaker points to .020-in. gap. Set the ignition so that No. 1 cylinder fires when the "U.D.C.-1-8" mark on flywheel is directly under the timing pointer on the right side of flywheel housing. Stationary points fire cylinders No. 1, 2, 8, 7. Adjustable points break at 45 deg. angle from stationary points, and fire cylinders No. 6, 5, 3, 4.

Spark Plugs

Standard equipment Champion 18 mm., No. 8-S. Proper gap is .025 in.

Valves

Intake valve head diameter 1 13/32 in. Exhaust valve head diameter 1 9/32 in. Valve seat angle 45 deg. Valve stem diameter 11/32 in. Valve spring length, valve open, 1 3/4 in. at 125 to 135 lb. pressure. Operating valve tappet clearance .016 in.

Valve Timing

With intake valve tappet clearance set at .020 in., intake valve opens 15 deg. or 5 1/2 flywheel teeth before top center, and exhaust valve closes 10

deg. or 3 3/4 flywheel teeth after top center.

Pistons

Aluminum alloy, cam ground. Remove from above. Piston should be fitted so that it will require a 7 to 13-lb. pull to remove a .003-in. feeler gage 1 in. wide from between the piston and cylinder wall. Install with T slot opposite valve side of engine. Piston pin diameter .875, pin locked in rod.

Connecting Rods

Remove from above. Bearing is steel-backed, lead-bronze lined.

Battery

Willard WH-1-13, 102 amp. hr. capacity.

Generator

Delco-Remy Model 662-M, with voltage control regulator. Maximum charging rate 19 amps. at 20 m.p.h. To increase charging rate, move third brush in direction of armature rotation. Ground field terminal at regulator when checking generator output.

Starter

Delco-Remy Model 737-J, with Bendix drive. Running free, amperage draw is 60 amps. With armature locked, amperage draw is 575 amps. at 3.2 volts, developing 15 ft.-lbs. of torque.

Brakes

Lockheed hydraulic, two-shoe type, with mechanical operation of rear-wheel brakes for parking. Brake drum diameter 12 1/2 in. Brake lining per wheel 25 in. x 1 1/4 in. x 1/4 in. To adjust, jack up all four wheels, rotate shoe adjustment cam toward nearest point of wheel rim until shoe comes in contact with drum, then back off adjustment until wheel rotates freely.

Steering

Ross cam and lever. To remove steering post end play, loosen adjust-

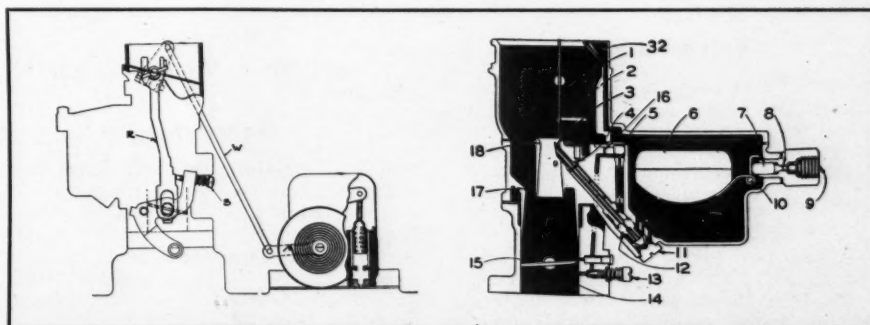
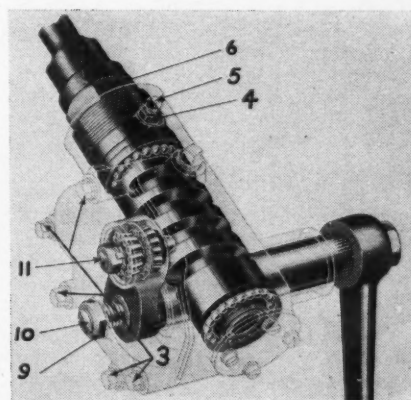
ing nut lock nut and screw (4 and 5), and turn steering post adjusting nut (6) down gradually until play is eliminated. To remove lever shaft end play, loosen lever shaft adjusting screw lock nut (9) and turn adjusting screw (10) in. After tightening lock nut, rotate steering wheel throughout its travel to make sure there is no bind.

Front Axle

Independent suspension. Caster minus 1/4 deg. to plus 1/2 deg., and is not adjustable after being set at factory. Camber is from 1 to 1 1/2 deg., and is adjusted by turning the eccentric located at the outer end of the steering knuckle support arm. Toe-in is from 1/8 in. to 7/32 in., and is adjusted by changing the length of the longer steering reach rod.

Rear Axle

Semi-floating type, gear ratio 4.7 to 1. Pinion adjustment is by means of shims between shoulder on pinion shaft and the cone of the front pinion bearing. To adjust, remove rear axle shafts, axle housing rear cover, the differential case and gear assembly, and the pinion flange and dust shield assembly. Press pinion shaft out through rear of housing and pry out oil retainer and gasket. Add or remove shims as needed. Ring gear lash is .002 to .004 in.





STUDEBAKER

Dictator Six

Engine

Starting Serial No. 5235001. Six-cylinder, $3\frac{1}{4}$ x $4\frac{1}{2}$ in. Firing order 1-5-3-6-2-4. Compression ratio 6.3 to 1. Compression pressure 105 lb. at cranking speed.

Carburetor

Stromberg EX-23, single downdraft $1\frac{1}{4}$ in. Idle adjustment—turn needle OUT for richer mixture, IN for leaner. Fuel level $\frac{1}{8}$ in. below gasket face of bowl. Main metering jets are non-adjustable, and cover all intermediate speeds. Calibration—venturi 1 $\frac{5}{32}$ in. Main discharge jet No. 28-32. High speed bleeder No. 70. Main metering jet .058 in. By-pass jet No. 56. Idle air bleed No. 55. Pump discharge nozzle No. 66. Automatic choke and fast idle mechanism built in. To adjust choke, with valve fully closed, adjust rod to provide $\frac{1}{32}$ in. clearance between thermostatic spring lever and stop. Thermostatic spring pointer should be set 10 notches rich on thermostat plate. Engine idle speed 8 m.p.h.

Distributor

Auto-lite IGW-4001, single breaker, automatic type with vacuum control. Adjust breaker point .018 to .024 in. gap.

Ignition Timing

Clean and adjust breaker points to .020 in. Set ignition so that No. 1 cylinder fires when "IGN" mark on vibration damper is directly under timing pointer on timing gear cover. This is 2 deg. or $\frac{3}{4}$ of flywheel tooth before top center.

Spark Plugs

Standard equipment Champion 18 mm. No. 8-S. Proper gap is .025 in.

Valves

Intake valve head diameter 1 $\frac{15}{32}$ in. Exhaust valve head diameter 1 $\frac{9}{32}$ in. Intake and exhaust valve stem diameter $\frac{11}{32}$ in. Valve seat angle 45 deg. Valve spring length, valve open, $1\frac{1}{4}$ in. at pressure of 125 to 135 lb. Operating valve tappet clearance .016 in.

Valve Timing

With valve tappets set at .020 in., inlet valve opens 15 deg. or $5\frac{1}{2}$ flywheel teeth before top center, and exhaust valve closes 10 deg. or $3\frac{3}{4}$ flywheel teeth after top center.

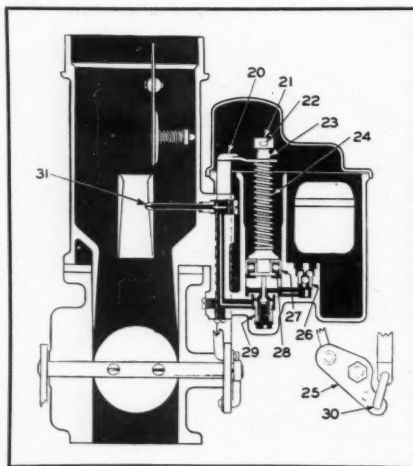
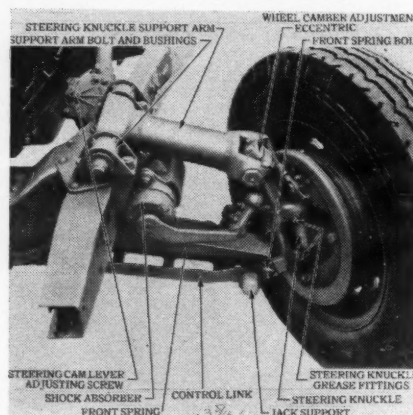
Pistons

Aluminum alloy, remove from above. Fit pistons so that it will require 7 to 15 lb. pull to withdraw a .002-in. feeler gage 1 in. wide from

between piston and cylinder wall. Install with T-slot opposite camshaft side of motor. Piston pin diameter .875 in. locked in rod.

Connecting Rods

Remove from above. Integral babbit bearings. Rods are off-set, and should be installed with wide section of bearing toward front in even numbered cylinders, and toward rear in odd numbered cylinders.



Battery

Willard, Model WH-1-13. Capacity 102 amp. hr.

Generator

Auto-lite GBM 4604 A-2. Maximum charging rate 17 to 19 amps. at 20 m.p.h. Third brush regulation—moving third brush in direction of armature rotation increases charging rate. Special heavy-duty generator with output of 25 amps. and with voltage control regulator available.

Starter

Auto-lite MAX 4019, with Bendix drive. Running free, amperage draw is 60 amps. With armature locked, amperage draw is 640 amps. at 3.2 volts, developing 16 ft.-lb. torque. Number of teeth in flywheel, 130.

Brakes

Lockheed hydraulic, with mechanical operation of rear wheel brakes for parking. Drums $11\frac{1}{8}$ -in. diameter. Brake lining per wheel 23 in. x $1\frac{1}{4}$ in. x $\frac{1}{4}$ in. To adjust, jack up all four wheels, rotate shoe adjustment cam toward nearest point of wheel rim until shoe comes in contact with drum, then back off adjustment until wheel rotates freely.

Steering

Ross cam and lever. To remove steering post end play, loosen adjusting nut lock nut and screw, and turn steering post adjusting nut down gradually until play is eliminated. To remove lever shaft end play, loosen lever shaft adjusting screw lock nut and turn adjusting screw in. After tightening lock nut, rotate steering wheel throughout its travel to make sure there is no bind.

Front Axle

Conventional I-beam, or independent suspension. With I-beam type, caster is 1 to $1\frac{1}{2}$ deg. Camber 1 to $1\frac{1}{2}$ deg. Toe-in $\frac{1}{16}$ to $\frac{1}{8}$ in. Kingpin inclination $9\frac{1}{2}$ deg. With independent suspension type, caster is from minus $\frac{1}{4}$ deg. to plus $\frac{3}{4}$ deg., and is not adjustable after being set at factory. Camber 1 to $1\frac{1}{2}$ deg. Adjust camber by turning eccentric located at the outer end of the steering knuckle support arm. Turning the wrench toward frame of car increases camber, turning toward wheel decreases camber. Toe-in is $\frac{1}{8}$ to $\frac{7}{32}$ in. Adjust by changing length of longer steering tie rod.

Rear Axle

Semi-floating type. Gear ratio 4.55 to 1. Pinion adjustment is by means of shims between shoulder on pinion shaft and cone of front pinion shaft bearing. Backlash between ring gear and pinion is .002 to .004 in.

Lubrication

Engine crankcase capacity 6 quarts. Use S.A.E. 30 in summer, S.A.E. 20 in winter. Transmission capacity $2\frac{1}{2}$ pints. Use S.A.E. No. 70 engine oil in summer, and S.A.E. No. 50 engine oil in winter. Rear axle capacity $2\frac{1}{2}$ pints. Use S.A.E. 110 lubricant in summer, S.A.E. 90 in winter.

TERRAPLANE

DeLuxe & Custom Six



Engine

Starting engine No. 15700, Serial No. 61101 and 62101. Six cylinder, 3 x 5 in. Firing order 1-5-3-6-2-4. Compression ratio 6 to 1. Compression pressure 80 lb. at cranking speed.

Carburetor

Carter 331-S on Model 61; Carter 329-S on Model 62. Single, downdraft 1 1/4 in. Idle adjustment—turn idle adjusting screw OUT for rich mixture, IN for lean. Standard setting 1/4 to 1 turn open for Model 61; 1/2 to 1 turn open for Model 62. Float level 3/8 in. from top of float to float chamber cover, with cover inverted and float needle seated. Accelerating pump is provided with three adjustments; use hole giving long stroke for winter, short stroke for summer and medium stroke for normal temperature. Calibration—primary venturi 11/32 in. Idle jet tube No. 70 drill. Accelerating pump discharge jet No. 72 drill. Main discharge nozzle No. 40 drill. Metering rod, Model 61, .065-.061-.040 in.; Model 62, .065-.060-.040 in.

Distributor

Auto-lite IGB 4301B. Single breaker type, automatic advance. Breaker point gap is .020 in.

Ignition Timing

Clean and adjust breaker points to .020 in. gap. Set distributor so that No. 1 cylinder fires at upper dead center, or when "U.D.C. 1-6" mark on flywheel is in line with pointer on inspection hole in left rear engine support plate.

Spark Plugs

Standard equipment is Champion 14 mm., type J-8. Proper gap is .022 in.

Valves

Intake and exhaust valve head diameter 1 1/8 in. Valve stem diameter 3/8 in. Intake and exhaust valve seat angle 45 deg. Valve spring length, valve closed, 2 in. at 44 lbs. pressure. Valve spring length, valve open, 1 21/32 in. at 102 lb. pressure. Operating valve tappet clearance, intake .006 in., exhaust .008 in.

Valve Timing

With intake valve lashed to .010 in. clearance, intake valve opens 10 2/3 deg. or 4 flywheel teeth before upper dead center, and exhaust valve closes 18 2/3 deg. or 7 flywheel teeth after top center. When installing timing gears, punch mark on tooth of crankshaft gear should mesh between two punch marked teeth on camshaft gear.

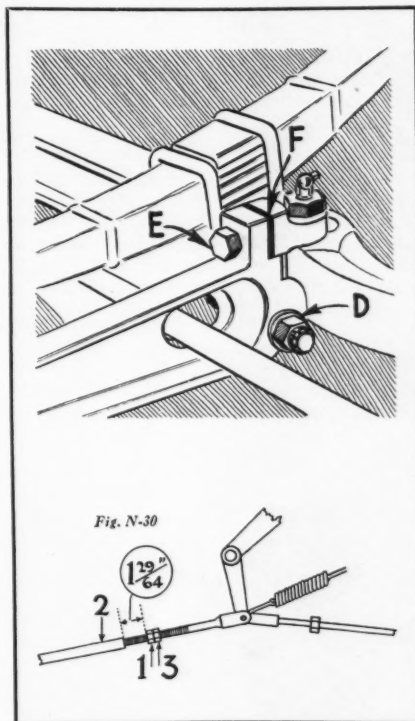
Pistons

Aluminum alloy, T slot, cam ground. Remove from above. Fitted with .002

in. clearance, at point 90 deg. from piston pin boss. Install in engine with T slot away from valve side of engine. Piston pin diameter 3/4 in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Bearings are spun babbitt, adjustable by removing shims. Install with long side of offset toward rear of engine in cylinders 1-2-4, and toward front of engine in cylinders 3-5-6.



Battery

National, 17 plate, 120 amp. hr. capacity. Positive terminal grounded.

Generator

Auto-lite, GAR 4702. Adjustable third brush type. Output controlled by voltage regulator on Model 62. Charging rate 14 amps. hot without voltage regulator, and 17 amps. hot with voltage regulator. If generator fails to charge, check 7 1/2 amp. fuse contained in knurled cup extending from the top of the regulator.

Starter

Auto-lite, MAB 4075. Drive through solenoid operated Bendix gear. With armature locked current draw is 775 amps. at 4 volts, developing 22 ft.lb. of torque. Flywheel has 134 teeth.

Clutch

Own, single plate, operating in oil. Adjust clutch pedal to allow 1 1/2 in. clearance between pedal and underside of floor board.

Brakes

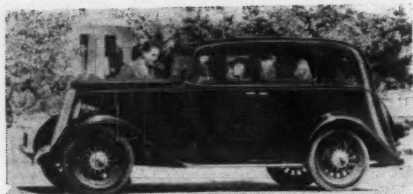
Bendix, two-shoe, hydraulically operated, with provision made for mechanical application to rear wheels overriding hydraulic operation. Hand brake mechanically operated rear wheel brakes for parking. Brake drum diameter 10 1/16 in. Brake lining per wheel 22 1/2 in. x 1 1/4 in. x 7/32 in. To adjust, jack up all four wheels and disconnect rear wheel cables from equalizer bar. Loosen eccentric lock nut and turn eccentric adjusting screw in direction of wheel forward rotation until a .010 in. feeler gage is snug between lining of secondary (rear) shoe and drum. Tighten eccentric lock nut. Expand shoes by turning notched adjusting wheel until heavy drag is felt and wheels can just be turned by hand. Pull the hand brake lever on, until equalizer bar plate is 1/8 in. from stop. Pull rear brake cables tight, and adjust ends so clevis pins just enter holes in plate. The rear face of the equalizer plate must be parallel to the face of the stop after this adjustment is made. Release hand brake, and back off notched adjusting wheel until drums are free of drag. To adjust mechanical follow-up to hydraulic operation of rear brakes, place equalizer bar against its stop and turn adjusting nut on rod until the rear face of the nut is 1 29/64 in. from front end of push rod.

Steering

Gemmer worm and sector. To remove sector shaft end play, loosen lock nut on adjusting screw, right side of steering housing, and turn screw in until play is removed. To remove worm shaft end play, loosen housing cover screws and remove shims between cover and housing. To eliminate backlash between worm and sector, loosen four housing cover stud nuts 1/4 turn, jack up front wheels and place in straight-ahead position. Turn eccentric sleeve right hand by gradual stages, noting result by moving pitman arm. When backlash is removed, tighten cover stud nuts and check for bind by turning steering wheel through entire range.

Front Axle

Elliott, "I" beam, attached to frame by two torque arms. Caster 3 1/2 to 4 1/2 deg. Camber 1 to 1 1/2 deg. Toe-in 1/8 in. King pin inclination 7 deg. To adjust caster, loosen nut "D" and remove capscrew "E" at front end of torque arm. Install shims of varying thickness at point "F" to obtain desired caster.



WILLYS

Model 77

Engine

Four cylinder, $3\frac{1}{2} \times 4\frac{1}{2}$ in. Firing order 1-3-4-2. Compression ratio 5.7 to 1. Compression pressure 87 lbs. at cranking speed.

Carburetor

Tillotson D-IE downdraft, $1\frac{1}{2}$ in. Idle adjustment—turn idle adjusting screw IN for rich mixture, OUT for lean. When adjusting carburetor with engine warm, set throttle stop screw

to engine speed of 25 to 30 m.p.h. Close idle adjusting screw "E" and open high speed adjusting screw "N" two full turns. Then turn high speed adjusting screw in slowly until engine falters, then back it out to point of maximum engine speed. From this point, turn the screw in $\frac{1}{4}$ of a turn. Set throttle stop screw to run engine slightly faster than idling speed and adjust idle screw to point of best idling performance, which is approximately 1 turn open. Float level is $1\frac{25}{32}$ in. from bottom of float to top of float chamber.

Distributor

Auto-lite. Single breaker type, automatic advance with vacuum control. Breaker point gap is .018 in.

Ignition Timing

Clean and adjust breaker points to .018 in. gap. Set distributor so that No. 1 cylinder fires when "IGN" mark on flywheel is in line with inspection hole cover screw located in left top side of flywheel housing, which is 5 deg. or $1\frac{1}{3}$ flywheel teeth after top center.

Spark Plugs

Standard equipment is Champion 18 mm., type C-7. Proper gap is .025 in.

Valve Timing

With intake and exhaust valves lashed to .010 in. clearance, intake valve opens at top center, or when "I-O" mark on flywheel is in line with inspection hole cover screw in flywheel housing, and exhaust valve closes 5 deg. or $1\frac{1}{3}$ flywheel teeth after top center. When installing tim-

ing chain, marks on timing sprockets should be brought together and in line with shaft centers when No. 1 and 4 pistons are at top center position.

Pistons

Light weight cast iron. Remove from above. Fitted with .0025 to .003 in. clearance. Piston pin diameter $\frac{7}{8}$ in. Pin floats in rod and piston.

Connecting Rods

Remove from above. Spun type babbitt bearing. Rods are offset at lower bearing, and should be installed in engine with short side of offset toward nearest main bearing.

Battery

U.S.L. 13 plate, 96 amp. hr. capacity. Negative terminal grounded.

Generator

Auto-lite. Adjustable third brush type. To increase charging rate, remove cover band and shift third brush in direction of armature rotation. Maximum charging rate, generator hot, 12.5 amps. at 8 volts, and car speed of 22 m.p.h.

Starter

Auto-lite. Drive through Bendix gear. Running free current draw is 70 amps. at 5.5 volts and speed of 4300 r.p.m. With armature locked current draw is 540 amps. at 4 volts, developing 12.25 ft. lbs. of torque. Flywheel has 96 teeth.

Brakes

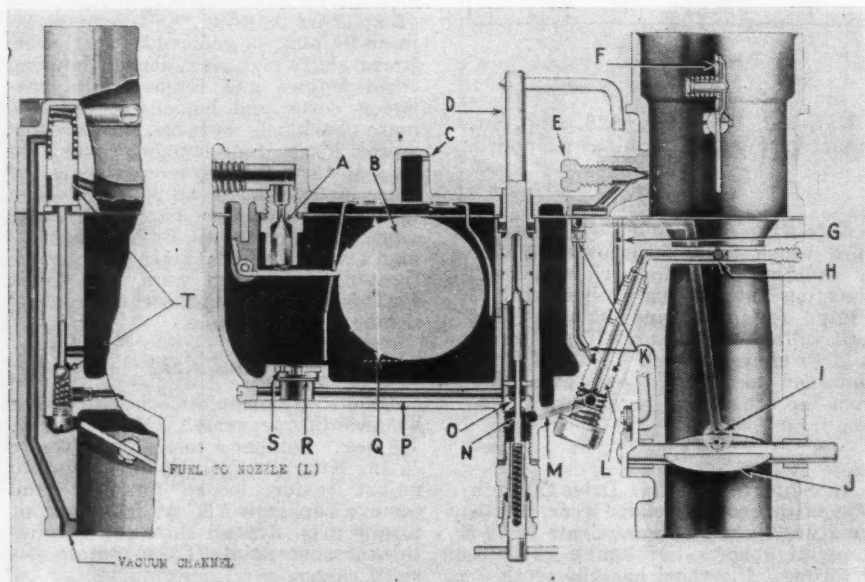
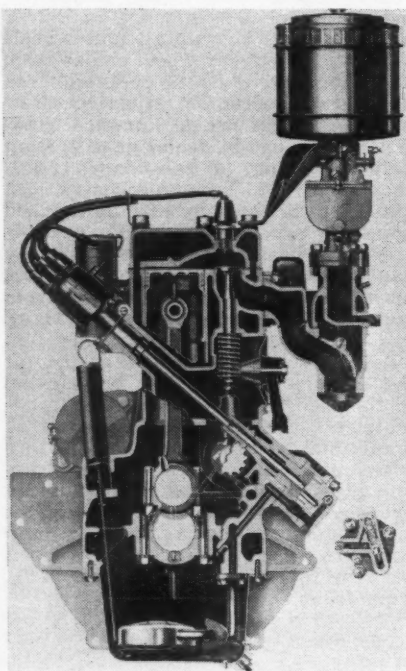
Bendix two-shoe, mechanically operated, with hand brake operated on all four wheels for parking. Brake drum diameter 9 in. Brake lining per wheel, $19\frac{3}{16}$ in. x $1\frac{1}{4}$ in. x $\frac{3}{16}$ in. To adjust, jack up all four wheels. Loosen eccentric lock nut and turn eccentric in direction of forward wheel rotation until slight drag is felt, then back off until wheel is free. Tighten eccentric lock nut. Expand shoes by turning notched adjusting wheel until slight drag is felt on drum, then back off until wheel is free.

Steering

Lavine worm and block type. To remove backlash between worm and drive block, disconnect drag link from pitman arm, loosen lock nut and turn adjusting screw on inner end of pitman arm shaft right hand. To remove worm shaft end play, remove steering housing lower end cover and remove shims as necessary to eliminate end play, without binding.

Front Axle

Reverse Elliott, "I" beam type. Caster 1 to 2 deg. Camber 2 deg. Toe-in $\frac{3}{32}$ in. King pin inclination $7\frac{1}{2}$ deg.



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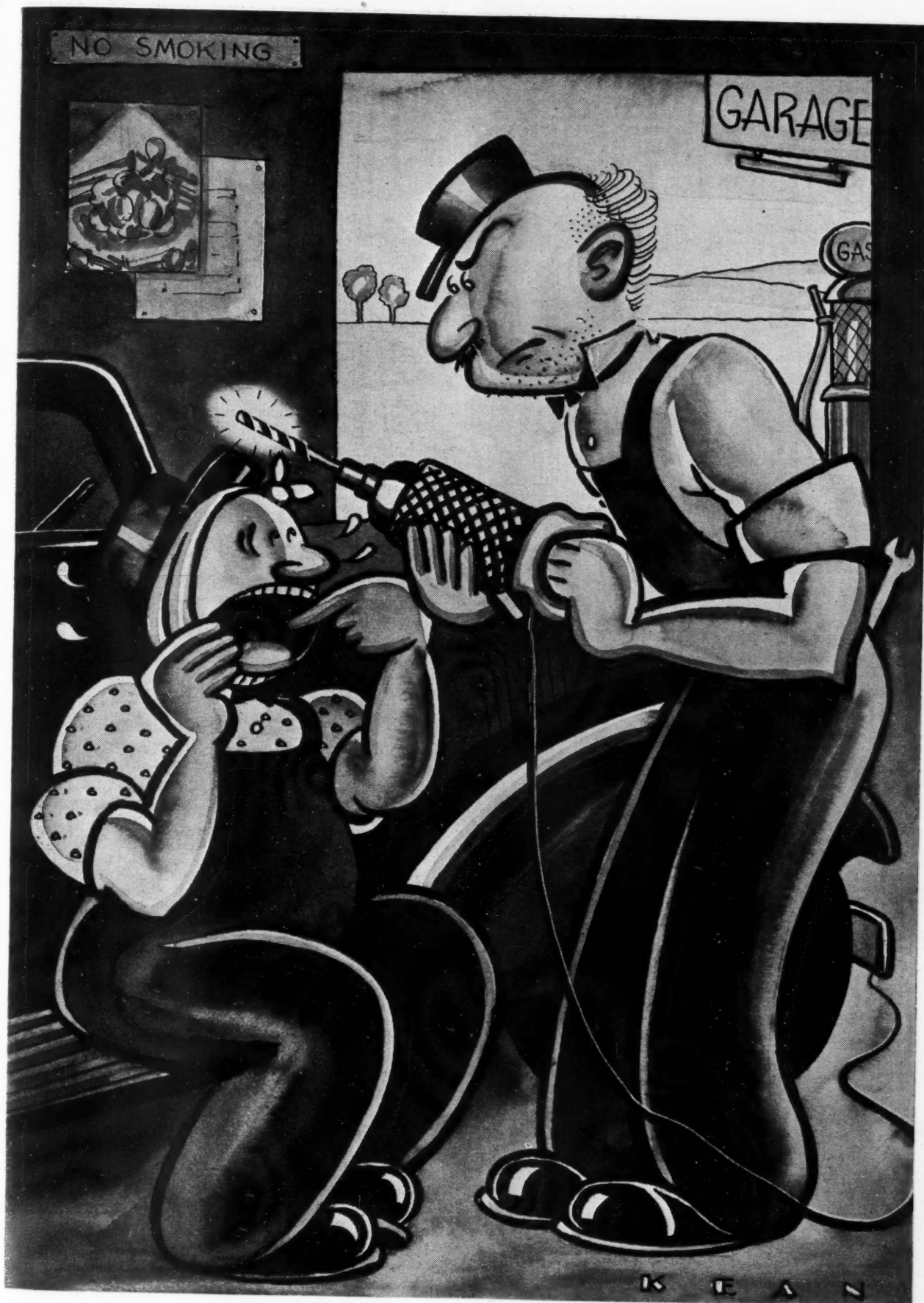
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AGE

April, 1936



"I'm no dentist, Herb, but I'll try. Which tooth is it?"

Specifications of Current

Line Number	CAR MAKE AND MODEL	Lowest Priced 4-Door Sedan	Wheelbase	Tire Size (Ins.)	No. of Cylinders Bore and Stroke	Taxable H.P.	Piston Displacement	Brake Horsepower at Specified R.P.M.	ENGINE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Tune Up Specifications—(1928 to 1936 Inclusive)

MAKE AND MODEL		No. of Cylinders and Bore and Stroke	Inlet Tappet Clearance for Valve Timing	VALVES				Rods Removed from	SPARK PLUG		IGNITION				Capacity Crank Case (Qtz.)	Capacity Cooling System (Qtz.)	Compression Pressure at Cranking Speed (Lbs.) (Standard Head)	CRANK-PIN		FRONT AXLE				
				Intake Valve Opens Before or After T. C.		Operating Tappet Clearance	Spark Plug		Gap	Timing (1000ths of Inch Indicates Piston Travel)		Diameter	Length	Caster (Degrees)				Camber (Degrees)	Toe-in (Inches)	Kingpin Inclination (Degrees)				
				No. of Degrees (E=Exhaust Valve)	No. of Flywheel Teeth (E=Exhaust Valve)					Intake	Exhaust										Make and Model	No. of Flywheel Teeth Spark Occurs TC	Breaker Gap	Breaker Housing
Auburn 76	1928-29	6-2 1/2 x 4 1/2	.010	TC	TC	.008H	.008H	B.	Ch-C4	.025	6	1 1/4	.021	A.	6	77	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7	
Auburn 88	1928-29	8-2 1/2 x 4 1/2	.010	E-10A	E-2 1/4	.008H	.008H	B.	Ch-C4	.027	10 1/2	3	.021	A.	8	77	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7	
Auburn 115	1928-29	8-3 1/4 x 4 1/2	.010	E-10A	E-3 1/4	.008H	.008H	B.	Ch-C4	.027	13 1/2	4 1/2	.021	A.	8	77	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7	
Auburn 6-80	1929	6-2 1/2 x 4 1/2	.010	E-10A	E-2 1/4	.008H	.008H	B.	Ch-C4	.025		(a)	.021	A.	6	19	78	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-90	1929	8-2 1/2 x 4 1/2	.010	E-10A	E-2 1/4	.008H	.008H	B.	Ch-C4	.027	10 1/2	3B.	.021	A.	8	22	78	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 120	1929	8-3 1/4 x 4 1/2	.010	E-10A	E-3 1/4	.007H	.007H	B.	Ch-C4	.027	13 1/2	4 1/2	.021	A.	8	22	103	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 6-85	1930	6-2 1/2 x 4 1/2	.010	E-10A	E-2 1/4	.008H	.008H	B.	Ch-C4	.025	8 1/2	2 1/2	.021	A.	6	19	90	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-95	1930	8-2 1/2 x 4 1/2	.010	E-10A	E-2 1/4	.008H	.008H	B.	Ch-2	.027	10 1/2	3B.	.022	A.	7	82		2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 125	1930	8-3 1/4 x 4 1/2	.010	E-10A	E-3 1/4	.007H	.007H	B.	Ch-C4	.027	13 1/2	4 1/2	.021	A.	8	25	105	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-98 & 8-98A	1931	8-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-2	.027	13B.	3 1/2	.021	A.	8	21	83	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-100	1932-33	8-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-C4	.027	13B.	3 1/2	.021	A.	8	21	83	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-100A	1932	8-3 1/4 x 4 1/2	.012	5B.	1 1/2	.007H	.007H	B.	Ch-2	.026	12 1/2	3 1/2	.021	A.	8	19	84	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 12-160	1932	12-3 1/4 x 4 1/2	.015	TC	TC	.010H	.010H	B.	Ch-C7	.025	11B.	3 1/2	.021	A.	9	37	89	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 12-160A	1932	12-3 1/4 x 4 1/2	.015	TC	TC	.010H	.010H	B.	Ch-C7	.025	11B.	3 1/2	.021	A.	9	37	89	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-101	1933	8-3 1/4 x 4 1/2	.012	5B.	1 1/2	.007H	.007H	B.	Ch-C4	.027	13B.	3 1/2	.021	A.	8	21	83	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-101A	1933	8-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-2	.026	12 1/2	3 1/2	.021	A.	8	19	84	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 12-161	1933	12-3 1/4 x 4 1/2	.015	TC	TC	.010H	.010H	B.	Ch-C7	.025	11B.	3 1/2	.021	A.	9	37	89	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 12-161A	1933	12-3 1/4 x 4 1/2	.015	TC	TC	.010H	.010H	B.	Ch-C7	.025	11B.	3 1/2	.021	A.	9	37	89	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 8-105	1933	8-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-2	.026	12 1/2	4B.	.021	A.	8	19	82	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 12-165	1933	12-3 1/4 x 4 1/2	.015	TC	TC	.010H	.010H	B.	Ch-C7	.025	11B.	3 1/2	.021	A.	9	37	89	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 1250	1934	12-3 1/4 x 4 1/2	.015	TC	TC	.010H	.010H	B.	Ch-C7	.025	11B.	3 1/2	.021	A.	9	37	89	2 1/2	1 1/4	2 1/4	2	1 1/4	7	7
Auburn 652X	1934	6-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-J6	.025	3B.	1B.	.019	Au.	6	17 1/2	103	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn 652Y	1934	6-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-J6	.025	3B.	1B.	.019	Au.	6	17 1/2	103	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn 850Y	1934	8-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-7	.025	3B.	1B.	.015	Au.	8	20	83	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn 850Y	1934	8-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-J6	.025	3B.	1B.	.015	Au.	8	21	103	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn 653	1935	6-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-J6	.025	3B.	1B.	.019	Au.	6	17 1/2	103	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn 851	1935	8-3 1/4 x 4 1/2	.010	5B.	1 1/2	.007H	.007H	B.	Ch-7	.025	3B.	1B.	.015	Au.	8	20	103	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn 654	1936	6-3 1/4 x 4 1/2	.012	7 1/2	2 1/2	.010H	.010H	B.	Ch-J6	.025	3B.	1B.	.018	Au.	6	16	103	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn 852	1936	8-3 1/4 x 4 1/2	.012	7 1/2	2 1/2	.010H	.010H	B.	Ch-J6	.025	3B.	1B.	.018	Au.	8	20	110	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Auburn SC-852	1936	8-3 1/4 x 4 1/2	.012	7 1/2	2 1/2	.010H	.010H	B.	Ch-J9B.	.025	3B.	1B.	.013	Au.	8	20	110	2 1/2	1 1/4	2 1/4	2	1 1/4	7 1/4	7 1/4
Austin	1930-31-32	4-2 1/2 x 3	.003	TC	TC	.003H	.004H	B.	Ch-C7	.027	.020B		.020		2 1/2	6	76	1 1/4	1 1/4	5	2 1/4	1 1/4	1 1/4	
Austin	1931-32-33	4-2 1/2 x 3	.003	TC	TC	.003H	.004H	B.	Ch-C7	.027	.020B		.020		2 1/2	6	76	1 1/4	1 1/4	5	2 1/4	1 1/4	1 1/4	
Austin 375	1933-34-35-36	4-2 1/2 x 3	.005	TC	TC	.005H	.007H	B.	Ch-C7	.027	.020B		.018	Re.	2 1/2	6	76	1 1/4	1 1/4	5	2 1/4	1 1/4	1 1/4	
Buick 115	1928	6-3 1/4 x 4 1/2	.008	TC	TC	.008H	.008H	B.	AC-C	.025	17B.	4B.	.021	A.	7	16	67	2	1 1/4	1-2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 120-128	1928	6-3 1/4 x 4 1/2	.008	TC	TC	.008H	.008H	B.	AC-C	.025	17B.	4B.	.021	A.	6 1/2	20	64	2 1/2	1 1/4	1-2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 116	1929	6-3 1/4 x 4 1/2	.008	17	2 1/2	.008H	.008H	B.	AC-G14	.025	17B.	5 1/2	.020	A.	7 1/2	17	63	2 1/2	1 1/4	1-2 1/2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 121-129	1929	6-3 1/4 x 4 1/2	.008	12 1/4	4 1/2	.008H	.008H	B.	AC-G14	.027	17B.	6 1/2	.021	A.	6 1/2	23	63	2 1/2	1 1/4	1-2 1/2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 40	1930	6-3 1/4 x 4 1/2	.008	10 1/2	3 1/2	.008H	.008H	B.	AC-G14	.027	15B.	5B.	.018	A.	5 1/2	16	67	2 1/2	1 1/4	1-2 1/2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 50	1930	6-3 1/4 x 4 1/2	.008	12 1/4	4A.	.008H	.008H	B.	AC-G14	.025	17B.	6B.	.018	A.	6	22	63	2 1/2	1 1/4	1-2 1/2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 60	1930	6-3 1/4 x 4 1/2	.008	12 1/4	4A.	.008H	.008H	B.	AC-G14	.027	17B.	6B.	.018	A.	6	22	63	2 1/2	1 1/4	1-2 1/2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 8-50	1931	8-2 1/2 x 4 1/2	.008	10 1/2	3 1/2	.008H	.008H	B.	AC-J12	.027	12B.	4B.	.018	A.	7	12	70	2 1/2	1 1/4	1-2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 8-60	1931	8-2 1/2 x 4 1/2	.008	10 1/2	3 1/2	.008H	.008H	B.	AC-J12	.027	11B.	3 1/2	.018	A.	7	12	70	2 1/2	1 1/4	1-2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 8-80	1931	8-2 1/2 x 4 1/2	.008	10 1/2	3 1/2	.008H	.008H	B.	AC-J12	.027	10B.	3 1/2	.018	A.	9	19	66	2 1/2	1 1/4	1-2E	2 1/4	1 1/4	7 1/4	7 1/4
Buick 8-90	1931	8-2 1/2 x 4 1/2	.008	10 1/2	3 1/2	.008H	.008H	B.	AC-J12	.027	10B.	3 1/2	.018	A.	9	19	66	2 1/2	1 1/					

Tune Up Specifications—(1928 to 1936 Inclusive)

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	Inlet Tapet Clearance for Valve Timing	VALVES				Rods Removed from	IGNITION						Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lbs.) (Standard Head)	CRANK-PIN		FRONT AXLE			
			Intake Valve Opens Before or After T. C.		Operating Tapet Clearance			Spark Plug		Timing (1000ths of Inch Indicates Piston Travel)		Diameter	Length				Caster (Degrees)	Camber (Degrees)	Toe-in (Inches)	Kingpin Inclination (Degrees)		
			No. of Degrees (E=Exhaust Valve)	No. of Flywheel Teeth (E=Exhaust Valve)	Intake	Exhaust		Make and Model	Gap	Spark Occurs % TC	No. of Flywheel Teeth Spark Occurs TC										Breaker Gap	Breaker Housing
Chevrolet Standard..... 1936	6-3 1/4x4	.006	9B.....	3 1/4B.....	.006H	.013H	A.....	AC-K11.....	.032	5B.....	1 1/4B.....	.021	Au.....	5	15	112	2 1/2	1 1/2	1 1/2	1 1/2	1 1/2	7 1/2 ± 1
Chrysler 72..... 1928	6-3 1/4x5	.008	6A.....	2A.....	.005H	.007H	A.....	AC-A.....	.029	12 1/2B.....	4B.....	.022	A.....	6	15	78	2 1/2	1 1/2	0-2E	0-4	7	
Chrysler 80 Imperial..... 1928-29	6-3 1/4x5	.008	6A.....	2A.....	.005H	.007H	A.....	AC-G13.....	.025	9 1/2B.....	3 1/4B.....	.022	A.....	8	19	99	2 1/2	1 1/2	0-2E	0-4	7	
Chrysler 65..... 1928-29	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-A.....	.029	7 1/2B.....	2B.....	.019	A.....	6	13	80	1 1/2	1 1/2	0-2E	0-4	7	
Chrysler 75..... 1928-29	6-3 1/4x5	.008	6A.....	2A.....	.005H	.007H	A.....	AC-A.....	.025	12B.....	4B.....	.022	A.....	6	15	76	2 1/2	1 1/2	0-2E	0-4	7	
Chrysler CC-66..... 1929-30	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-A.....	.027	.020	2 1/4B (f)	.020	A.....	6	14	76	1 1/2	1 1/2	0-2E	0-4	7	
Chrysler CC-66..... 1930	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-G11.....	.027	.035	2 1/4B.....	.020	A.....	6	14	76	1 1/2	1 1/2	0-2E	0-4	7	
Chrysler 77..... 1929-30	6-3 1/4x5	.011	.017		.005H	.007H	A.....	AC-G13.....	.027	12B.....	4B.....	.022	A.....	6	21	74	2 1/2	1 1/2	0-2E	0-4	7	
Chrysler 70..... 1929-30-31	6-3 1/4x4 1/2	.011	2A.....		.005H	.007H	A.....	AC-G13.....	.027	.035	2 1/4B.....	.022	A.....	6	21	74	2 1/2	1 1/2	0-2E	0-4	7	
Chrysler 70..... 1929-30-31	6-3 1/4x5	.009	6A.....	2A.....	.005H	.009H	A.....	AC-G13.....	.025	.035B	3 1/4B.....	.022	A.....	8	21	99	2 1/2	1 1/2	1 1/2-2E		7	
Chrysler CJ..... 1930-31	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-G13.....	.027	.035B	2 1/4B.....	.020	Au.....	6	12		1 1/2	1 1/2	1 1/2-2E	0-2	7	
Chrysler CD..... 1930	6-3 1/4x4 1/2	.011	4B.....	1B (g)	.005H	.007H	AB	AG-G13.....	.022		2 1/4B.....	.020	Au.....	6	16	83	2 1/4	1 1/2	1 1/2-2E	0-2	7	
Chrysler CD..... 1931	6-3 1/4x4 1/2	.011	2A.....		.005H	.007H	AB	AC-G13.....	.022		(h)	.020	Au.....	6	16	83	2 1/4	1 1/2	1 1/2-2E	0-2	7	
Chrysler CG-Imperial..... 1930-31	6-3 1/4x5	.008	6A.....	2A.....	.005H	.007H	A.....	AC-G12.....	.022	10B.....	3 1/4B.....	.020	Au.....	8 1/2	26	76	2 1/4	1 1/2	1 1/2-2E	0-2	7	
Chrysler CM..... 1931	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-G12.....	.022	.034B	3B.....	.020	A.....	6	16	80	1 1/2	1 1/2	1 1/2-2E	0-2	7	
Chrysler CD-DeLuxe..... 1931	6-3 1/4x4 1/2	.011	6A.....	1 1/4A.....	.005H	.007H	A.....	AC-K12.....	.022	.040B	3 1/4B.....	.020	Au.....	6	19	80	2 1/4	1 1/2	1 1/2-2E	0-2	7	
Chrysler CI..... 1932	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-K12.....	.028	10B.....	3B.....	.020	Au.....	6	16	84	1 1/2	1 1/2	1-3		7	
Chrysler CP..... 1932	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-K12.....	.028	10B.....	3B.....	.020	Au.....	6	19	80	2 1/4	1 1/2	1-3		7	
Chrysler CH & CL-Imperial..... 1932	6-3 1/4x5	.008	6A.....	2A.....	.005H	.007H	A.....	AC-K12.....	.028	11 1/4B.....	4B.....	.020	Au.....	8 1/2	24	80	2 1/4	1 1/2	1-3		7	
Chrysler CO..... 1933	6-3 1/4x4 1/2	.011	6A.....	2 1/4A.....	.005H	.007H	A.....	AC-K12.....	.025	1C.....	TC.....	.020	Au.....	6	15 1/2	85	1 1/2	1 1/2	1-3		7	
Chrysler CT-Royal..... 1933	6-3 1/4x4 1/2	.011	6A.....	2 1/4A.....	.005H	.007H	A.....	AC-K12.....	.025	2B.....	3 1/4B.....	.018	Au.....	6	19 1/2	80	2 1/4	1 1/2	1-3		7	
Chrysler CQ-Imperial..... 1933	6-3 1/4x4 1/2	.011	6A.....	2 1/4A.....	.005H	.007H	A.....	AC-K12.....	.025	10B.....	4B.....	.018	Au.....	6	20	103	2 1/4	1 1/2	1-3		7	
Chrysler CL-Imperial..... 1933-34	6-3 1/4x5	.008	6A.....	2A.....	.005H	.007H	A.....	AC-K12.....	.026	11 1/4B.....	4B.....	.019	Au.....	8 1/2	28	95	2 1/4	1 1/2	1-3		7	
Chrysler CA & CB-Six..... 1934	6-3 1/4x4 1/2	.010	TC.....	1C.....	.005H	.007H	A.....	AC-S9.....	.025	TC.....	TC.....	.020	Au.....	6	15 1/2	87	2 1/4	1 1/2	1 1/2-2 1/2		8 1/2-10 1/2	
Chrysler CU-Airflow..... 1934	6-3 1/4x4 1/2	.011	2B.....	1B.....	.005H	.007H	A.....	AC-SL9.....	.025	6A.....	1 1/4A.....	.018	Au.....	6	23	110	2 1/4	1 1/2	1-3		9	
Chrysler CV-Imperial..... 1934	6-3 1/4x4 1/2	.011	2B.....	1B.....	.005H	.007H	A.....	AC-SL9.....	.025	5A.....	1 1/4A.....	.018	Au.....	6	23	110	2 1/4	1 1/2	1-3		9	
Chrysler C6-Airstream..... 1935	6-3 1/4x4 1/2	.012	2B.....	1B.....	.006H	.008H	A.....	AC-KL-9.....	.025	TC.....	TC.....	.018	Au.....	6	15 1/2	99	2 1/4	1 1/2	1 1/2-2 1/2		8 1/2-10 1/2	
Chrysler C7-Airstream..... 1935	6-3 1/4x4 1/2	.012	2B.....	1B.....	.006H	.008H	A.....	AC-K-9.....	.025	TC.....	TC.....	.018	Au.....	6	20	103	2 1/4	1 1/2	1 1/2-2 1/2		41-51	
Chrysler C1-Airflow..... 1935	6-3 1/4x4 1/2	.012	2B.....	1B.....	.006H	.008H	A.....	AC-KL-9.....	.025	TC.....	TC.....	.018	Au.....	6	19	103	2 1/4	1 1/2	1 1/2-2 1/2		4	
Chrysler C2-Imperial..... 1935	6-3 1/4x4 1/2	.011	2B.....	1B.....	.006H	.008H	A.....	AC-KL-9.....	.025	5A.....	2A.....	.018	Au.....	6	19	110	2 1/4	1 1/2	1 1/2-2 1/2		9 1/4	
Chrysler C3-Imperial..... 1935	6-3 1/4x4 1/2	.012	2B.....	1B.....	.006H	.008H	A.....	AC-KL-9.....	.025	5A.....	2A.....	.018	Au.....	6	19	110	2 1/4	1 1/2	1 1/2-2 1/2		4	
Chrysler C7-Six..... 1936	6-3 1/4x4 1/2	.010	TC.....	TC.....	.006H	.008H	A.....	AC-K9.....	.025	TC.....	TC.....	.020	Au.....	6	19	99	2 1/4	1 1/2	1 1/2-2 1/2		5 1/2	
Chrysler C8-DeLuxe..... 1936	6-3 1/4x4 1/2	.011	2B.....	1 1/2B.....	.006H	.008H	A.....	AC-K9.....	.025	TC.....	TC.....	.018	Au.....	6	22	103	2 1/4	1 1/2	1 1/2-2 1/2		5 1/2	
Chrysler C9 & C10-Airfl. 8..... 1936	6-3 1/4x4 1/2	.011	2B.....	1 1/2B.....	.006H	.008H	A.....	AC-K9.....	.025	TC.....	TC.....	.018	Au.....	6	17	103	2 1/4	1 1/2	1 1/2-2 1/2		5 1/2	
Chrysler C11-Airflow Imp. 8..... 1936	6-3 1/4x4 1/2	.011	2B.....	1 1/2B.....	.006H	.008H	A.....	AC-KL-9.....	.025	5A.....	2A.....	.018	Au.....	6	17	110	2 1/4	1 1/2	1 1/2-2 1/2		5	
Chrysler Arl. Cust. Imp. 8..... 1936	6-3 1/4x4 1/2	.011	2B.....	1 1/2B.....	.006H	.008H	A.....	AC-KL-9.....	.025	5A.....	2A.....	.018	Au.....	6	17	110	2 1/4	1 1/2	1 1/2-2 1/2		5	
Cord L-29..... 1930-31	6-3 1/4x4 1/2	.010	10A.....	3A.....	.006H	.008H	B.....	Ch-C7.....	.026	13B.....	4B.....	.021	A.....	8	22	82	2 1/2	1 1/2	1 1/2-2E		1 1/2	
De Soto K..... 1928-29-30	6-3 1/4x5	.008	6A.....	2A.....	.004H	.006H	A.....	AC-G11.....	.028	.035B	2 1/4B.....	.020	Au.....	6	10	76	1 1/2	1 1/2	1-2E		7	
De Soto CK..... 1930	6-3 1/4x4 1/2	.008	6A.....	2A.....	.004H	.006H	A.....	AC-G10.....	.028	8B.....	3B.....	.020	Au.....	6	10	80	1 1/2	1 1/2	1-2E		7	
De Soto CF..... 1930	6-2 1/4x4 1/2	.011	4B.....	1 1/4B.....	.005H	.007H	B.....	AC-G10.....	.022	10B.....	3B.....	.022	A.....	6	16	80	2 1/4	1 1/2	2E		7	
De Soto CF..... 1931	6-3 1/4x4 1/2	.011	4B.....	1 1/4B.....	.005H	.007H	B.....	AC-G10.....	.022	10B.....	3B.....	.022	A.....	6	16	80	2 1/4	1 1/2	1 1/2-2E		7	
De Soto SA..... 1931	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-G11.....	.022	.055B	3B.....	.020	Au.....	6	15	80	1 1/2	1 1/2	1 1/2-2E		7	
De Soto SC..... 1932	6-3 1/4x4 1/2	.011	6A.....	2A.....	.005H	.007H	A.....	AC-K12.....	.022	9B.....	2 1/4B.....	.020	Au.....	6	14 1/2	84	1 1/2	1 1/2	1-3		7	
De Soto SD..... 1933	6-3 1/4x4 1/2	.011	6A.....	2 1/4A.....	.005H	.007H	A.....	AC-K12.....	.025	(k)	(k)	.020	Au.....	6	16	85	1 1/2	1 1/2	1-3		7	
De Soto SE-Airflow..... 1934	6-3 1/4x4 1/2	.010	TC.....	TC.....	.005H	.007H	A.....	AC-SL9.....	.025	3A.....	3A.....	.020	Au.....	6	20	102	2 1/4	1 1/2	1-3		9	
De Soto SF-Airstream..... 1935	6-3 1/4x4 1/2	.010	TC.....	TC.....	.006H	.008H	A.....	AC-K9.....	.025	3A.....	3A.....	.020	Au.....	6	17	103	2 1/4	1 1/2	1 1/2-2 1/2		9	
De Soto SG-Airflow..... 1935	6-3 1/4x4 1/2	.010	TC.....	TC.....	.006H	.008H	A.....	AC-K9.....	.025	3A.....	3A.....	.020	Au.....	6	17	103	2 1/4	1 1/2	1-3		4	
De Soto S1-Airstream..... 1936	6-3 1/4x4 1/2	.010	TC.....	TC.....	.006H	.008H	A.....	AC-K9.....	.025	TC.....	TC.....	.020	Au.....	6	19	99	2					

Tune Up Specifications—(1928 to 1936 Inclusive)—Continued

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES				IGNITION										Capacity Crank Case (Qtz.)	Capacity Cooling System (Qtz.)	Compression Pressure at Cranking Speed (Lbs.) (Standard Head)	CRANK-PIN		FRONT AXLE			
		Intake Valve Opens Before or After T. C.	Operating Tappet Clearance	Rods Removed from	Spark Plug	Timing (1000ths of Inch Indicates Piston Travel)					Breaker Gap	Breaker Housing	Diameter	Length	Caster (Degrees)				Camber (Degrees)	Toe-in (Inches)	Kingpin Inclination (Degrees)			
						No. of Degrees (E=Exhaust Valve)	No. of Flywheel Teeth (E=Exhaust Valve)	Make and Model	Gap	Spark Occurs												No. of Flywheel Teeth Spark Occurs TC		
Graham 46-Standard..... 1930-31	6-3 1/4x4 1/2	.010C	TC	.010H	.010H	B.	Ch-C4	.025 1B.	1/8B.	.020 A.	6	20	86 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 45-Special..... 1930-31	6-3 1/4x4 1/2	.010C	TC	.010H	.010H	B.	Ch-C4	.025 1B.	1/8B.	.020 A.	6	20	88	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 822-Standard..... 1930-31	6-3 1/4x4 1/2	.010C	TC	.010H	.010H	B.	Ch-C7	.025 5B.	1 1/4B.	.020 A.	8	20	80	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham Custom 8..... 1930	6-3 1/4x4 1/2	.012	2A	1/2A	.010H	.010H	B.	Ch-C7	.023 4B.	1 1/4B.	.020 A.	8	26	86 1/2	2 1/4	1 1/4	1 1/4	1 1/4	9					
Graham Custom 8..... 1931	6-3 1/4x4 1/2	.012	2A	1/2A	.010H	.010H	B.	Ch-C7	.023 4B.	1 1/4B.	.020 A.	8	27	80	2 1/4	1 1/4	1 1/4	1 1/4	9					
Gra'm 42-822 & 42-834 1930-31-32	6-3 1/4x4 1/2	.010C	TC	.010H	.010H	B.	Ch-C7	.025 5B.	1 1/4B.	.020 A.	8	27	87	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 53-Standard..... 1931-32	6-3 1/4x4 1/2	.010C	TC	.010H	.010H	B.	Ch-C4	.025 1B.	1/8B.	.020 A.	6	20	89	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 54-Special..... 1931-32	6-3 1/4x4 1/2	.010C	TC	.010H	.010H	B.	Ch-C4	.025 1B.	1/8B.	.020 A.	6	20	89	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 820-Special..... 1931-32	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C7	.025 6B.	1 1/4B.	.020 A.	6	20	89	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham Pros. 6-Gr. 6. 1931-32-33	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C4	.025 1B.	1/8B.	.020 A.	6	20	86 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 58..... 1932	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C4	.025 3B.	1B.	.018 A.	6	20	88	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 57-Bi Std..... 1932-33	6-3 1/4x4 1/2	.012	1C	.010H	.010H	B.	Ch-C4	.025 6B.	1 1/4B.	.020 A.	6	20	109 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 65-Standard..... 1933	6-3 1/4x4 1/2	.012	1C	.010H	.010H	B.	Ch-C4	.025 3B.	1 1/4V.	.019 Au.	6	20	109 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 64-Standard..... 1933	6-3 1/4x4 1/2	.012	1C	.010H	.010H	B.	Ch-C4	.025 3B.	1 1/4V.	.019 Au.	6	20	109 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 57A-Custom..... 1933	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C7	.025 3B.	1 1/4B.	.018 A.	6	20	109 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 68..... 1934	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C4	.025 3B.	1B.	.018 A.	6	20	109 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham Standard & Spec..... 1934	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C4	.025 3B.	1B.	.018 A.	6	20	109 1/2	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 69..... 1934	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C7	.025 3B.	1B.	.015 Au.	6	20	113	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 74-Standard..... 1935	6-3x4	.012	2B.	1B.	.010H	.010H	A.	Ch-C7	.025 2B.	1B.	.018 Au.	5	15	95	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 73-Special..... 1935	6-3 1/4x4 1/2	.012	2B.	1/2B.	.010H	.010H	B.	Ch-C7	.025 3B.	1 1/4B.	.018 Au.	6	17 1/2	105	2 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 72-75..... 1935	6-3 1/4x4 1/2	.012	TC	.010H	.010H	B.	Ch-C7	.025 3B.	1B.	.018 Au.	7	18	115	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 6-90-Crusader..... 1936	6-3x4	.012	4 1/2B.	1 1/2B.	.010H	.010H	A.	Ch-C7	.025 2B.	1/2B.	.018 Au.	5	15	115	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham 6-90-Cavalier..... 1936	6-3 1/4x4 1/2	.012	4 1/2B.	1 1/2B.	.010H	.010H	A.	Ch-C7	.025 2B.	1/2B.	.018 Au.	5	15 1/2	114	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham Sup. Ch-110..... 1936	6-3 1/4x4 1/2	.012	4 1/2B.	1 1/2B.	.010H	.010H	A.	Ch-C7	.025 2B.	1/2B.	.018 Au.	5	18 1/2	119	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 619..... 1928-29	6-3 1/4x5	.010	TC	.010H	.010H	B.	Ch-C4	.025 6B.	2B.	.020 A.	7	25 1/2	79	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 629..... 1928-29	6-3 1/4x5	.010	TC	.010H	.010H	B.	Ch-C4	.025 6B.	2B.	.020 A.	7	25 1/2	79	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 835..... 1928-29	6-3 1/4x4 1/2	.010C	2A	1 1/2A	.008H	.008H	B.	Ch-C7	.025 4B.	1 1/4B.	.018 A.	8	27	89 1/2	2 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 615..... 1929	6-3 1/4x4 1/2	.010	1C	.010H	.010H	B.	Ch-C4	.025 1B.	1/8B.	.019 A.	6	20	88.6	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 612..... 1929	6-3 1/4x4 1/2	.010	TC	(n)	.010H	B.	Ch-C4	.025 SPF*	SPF*	.019 A.	6	22 1/2	90	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 612..... 1930	6-3 1/4x4 1/2	.010	TC	(n)	.010H	B.	Ch-C4	.025 SPF*	SPF*	.020 A.	7	25	85	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 621..... 1929-30	6-3 1/4x5	.010	TC	.010H	.010H	B.	Ch-C4	.025 SPF*	SPF*	.018 A.	8	27	89	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 827..... 1929	6-3 1/4x4 1/2	.012	2A.	1/2A	(p)	(p)	B.	Ch-C7	.025 4B.	1 1/4B.	.018 A.	8	27 1/2	89	2 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 837..... 1929	6-3 1/4x4 1/2	.012	2A.	1/2A	(p)	(p)	B.	Ch-C7	.025 4B.	1 1/4B.	.018 A.	8	27 1/2	89	2 1/4	1 1/4	1 1/4	1 1/4	9					
Graham-Paige 827..... 1930	6-3 1/4x4 1/2	.012	2A.	1/2A	(p)	(p)	B.	Ch-C7	.025 4B.	1 1/4B.	.018 A.	8	27 1/2	89	2 1/4	1 1/4	1 1/4	1 1/4	9					
Hudson Greater 6..... 1929	6-3 1/4x5	.004	10 1/2B.	3 1/2B.	.004H	.007H	(r)	AC-G10	.022 10B.	3B.	.020 A.	7	99	99	2 1/4	2	1E	2 1/4	6 1/2					
Hudson Greater 8..... 1930	6-3 1/4x4 1/2	.004	10 1/2B.	3 1/2B.	.004H	.006H	B.	AC-G10	.023 TC	TC	.020 Au.	8	18	95	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson Greater 8..... 1931	6-3 1/4x4 1/2	.004	10 1/2B.	3 1/2B.	.004H	.006H	B.	AC-G10	.023 TC	TC	.020 Au.	8	17	95	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson Greater 8..... 1932	6-3 1/4x4 1/2	.010	11B.	3 1/2B.	.006H	.008H	B.	AC-G8	.022 TC	TC	.020 Au.	9 1/2	17	95	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson E-Super 6..... 1933	6-2 1/4x4 1/2	.006	11B.	3 1/2B.	.006H	.008H	B.	AC-K9	.022 TC	TC	.020 Au.	6 1/2	14 1/2	103	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson T-Std. & L-Maj. 8..... 1933	6-3 1/4x4 1/2	.006	11B.	3 1/2B.	.006H	.008H	B.	AC-G8	.020 TC	TC	.020 Au.	8	17	95	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson LT & LTS..... 1934	6-3 1/4x4 1/2	.010	10 1/2B.	4B.	.006H	.008H	A.	Ch-J7	.022 TC	TC	.020 Au.	7	23	93	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson LH..... 1934	6-3 1/4x4 1/2	.010	10 1/2B.	4B.	.006H	.008H	A.	Ch-J7	.022 TC	TC	.020 Au.	7	23	93	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson GG..... 1935	6-3 1/4x4 1/2	.010	10 1/2B.	4B.	.006H	.008H	A.	Ch-J7	.025 TC	TC	.020 Au.	6	16	103	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson HT-HU-HHU..... 1935	6-3 1/4x4 1/2	.010	10 1/2B.	4B.	.006H	.008H	BA	Ch-J7	.020 TC	TC	.020 Au.	7	18	104	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson 6-63..... 1936	6-3x5	.010	10 1/2B.	3 1/2B.	.006H	.008H	A.	Ch-J8	.022 TC	TC	.020 Au.	5	13	103	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hudson 8-64, 5, 687..... 1936	8-3x4 1/2	.010	10 1/2B.	4B.	.006H	.008H	BA	Ch-J8	.022 TC	TC	.020 Au.	7	20	99	1 1/4	1 1/4	1 1/4	1 1/4	7					
Hupmobile M-1-Cent..... 1928-29	8-3x4 1/2	.010	4A.	1A.	.008C	.009C	B.	Ch-C7	.029 9B.	2 1/2B.	.021 A.	8	21	76	2 1/4	1 1/4	2-4L	2 1/4	5 1/2					
Hupmobile M-Cent..... 1928-29	8-3x4 1/2	.010	4A.	1A.	.008C	.009C	B.	Ch-C7	.029 9B.	2 1/2B.	.021 A.	8	21	76	2 1/4	1 1/4	2-4L	2 1/4	5 1/2					
Hupmobile S-Cent..... 1930	6-3 1/4x4 1/2	.010	4A.	1A.	.008C	.008C	B.	Ch-C7	.025 TC	TC	.018 Re.	6	13	72	2 1/4	1 1/4	1 1/4	1 1/4	7 1/2					
Hupmobile S1-Cent..... 1930	6-3 1/4x4 1/2	.010	4A.	1A.	.008C	.010C	B.	Ch-C7	.025 TC	TC	.018 A.	6	13	72	2 1/4	1 1/4	1 1/4	1 1/4	7 1/2					
Hup. C-Cent. & C-2-21. 1930-31-32	8-3x4 1/2	.010	1B.	1/2B.	.007C	.014C	B.	Ch-C7	.027 9B.	3B.	.020 A.	9												



WORDS OF PRAISE for Pontiac Dealers

WHEN a motor-car buyer goes out of his way to praise the man who sold him, that, we submit, is news of the most unusual kind. Yet precisely that is happening in the case of Pontiac dealers—and not just in isolated instances! Letters by the hundreds bring us assurance that the public has a hearty liking and respect for the way our dealers do business.

These enthusiastic words of praise are all the more gratifying because they justify so completely our entire dealer policy. It is our intent to build a dealer organi-

zation of able, substantial business men, eager to get on in the world, and fully aware that permanent success depends on proper treatment of the public. Our dealer program, our dealer franchise and, above all, our products, are designed to attract exactly that type of man. How well we have succeeded there is no need for us to say. Instead, we refer you below where you can read the judgments of the court of final appeal—the Great American Public.

PONTIAC MOTOR COMPANY, PONTIAC, MICHIGAN

"The dealer from whom I bought my Pontiac is Ace high. He has given me very fine and courteous service and, believe me, I am very particular."

R.C.A., Minneapolis, Minn.*

"I cannot praise your dealer too highly. The gentleman who sold us our Pontiac is a very high type of man and a decided asset to your organization in every respect."

C.L.A., Rahway, New Jersey*

"Your dealer, his officers and his employees are credits to our community."

A.F.A., Reno, Nevada*

"Your Bradford dealer has always extended the last word in service and I believe his excellent reputation is the reason he does so much business. I know that is why I purchased my Pontiac from him."

W.A.N., Bradford, Pa.*

"Due to the praise given your dealer by other Pontiac owners, I was not afraid to deal with him and found him not only a real business man but a real man."

W.A., Cherry Tree, Pa.*

"In regard to your Ravenna dealer, I do not believe you could find a better one. His service is of the best and it is indeed a pleasure to do business with so fine a gentleman."

R.V.D., Ravenna, Ohio*

"I am especially pleased with the service rendered by your local dealer, and this fact is emphasized by my buying my second Pontiac within one year."

J.A.W., Alexandria, La.*

"I cannot speak too highly of the service, courtesy, and everything that tends to draw people to high grade merchandise, that your dealer has extended to me."

J.J.D., Troy, New York*

"Everyone speaks very highly of your dealer here. Anyone dealing with him knows they will receive only fairness and wholehearted co-operation."

V.B., Marshalltown, Iowa*

"I purchased my Pontiac from your dealer and the relationship it has been my fortune to have with this dealer clearly demonstrates how far the automobile industry has gone since the day of the 'greasy floor' dealer."

O.H.B., San Antonio, Texas*

*Excerpt from a letter on file at the Pontiac Motor Co.

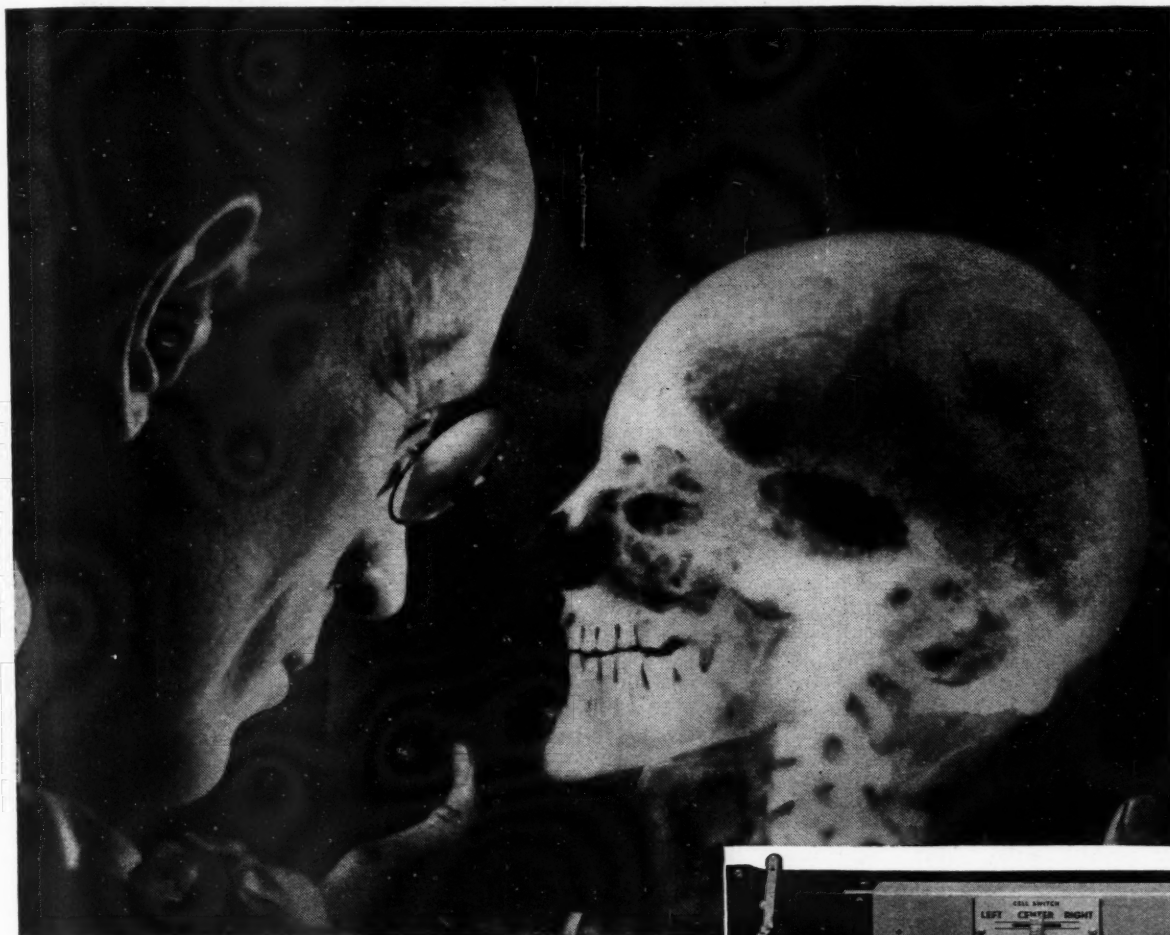
Pontiac
DIVISION OF GENERAL MOTORS



Tune Up Specifications—(1928 to 1936 Inclusive)—Continued

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES				IGNITION								Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lbs.) (Standard Head)	CRANK-PIN		FRONT AXLE			
		Inlet Tappet Clearance for Valve Timing	Intake Valve Opens Before or After T. C.		Operating Tappet Clearance	Rods Removed from	Spark Plug Make and Model	Gap	Timing (1000ths of Inch Indicates Piston Travel)				Diameter				Length	Caster (Degrees)	Camber (Degrees)	Toe-in (Inches)	Kingpin Inclination (Degrees)	
			No. of Degrees (E=Exhaust Valve)	No. of Flywheel Teeth (E=Exhaust Valve)					Intake	Exhaust	Spark Occurs %TC	No. of Flywheel Teeth Spark Occurs TC										Breaker Gap
Packard 1003-Super 8.....	1933	8-3/16x5	.004	30B.....	10B.....	.004H .004H	A.....	AC-K7.....	.025	7 1/2B.....	2 1/2B.....	.020	Au.....	10	20	99	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	8 1/2
Packard 1004-Super 8.....	1933	8-3/16x5	.004	30B.....	10B.....	.004H .004H	A.....	AC-K7.....	.025	7 1/2B.....	2 1/2B.....	.020	Au.....	10	20	99	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	8 1/2
Packard 1005-V12.....	1933	12-3/16x4	.000	TC.....	TC.....	AA.....	(t) AC-K7.....	.025	5 1/2B.....	1 1/2B.....	.020	Au.....	10	40	99	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	8 1/2	
Packard 1006-V12.....	1933	12-3/16x4	.000	TC.....	TC.....	AA.....	(t) AC-K7.....	.025	5 1/2B.....	1 1/2B.....	.020	Au.....	10	40	99	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	8 1/2	
Packard 1100, 1101, 1102.....	1934	8-3/16x5	.004	30B.....	10B.....	.004H .006H	(t) AC-K7.....	.025	6B.....	2B.....	.020	Au.....	8	20	99	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard 1103, 4, 5-Super 8.....	1934	8-3/16x5	.004	30B.....	10B.....	.004H .006H	(t) AC-K7.....	.025	6B.....	2B.....	.020	Au.....	10	20	99	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard 1107, 1108-V12.....	1934	12-3/16x4	.000	TC.....	TC.....	AA.....	(t) AC-K9.....	.025	8B.....	2 1/2B.....	.020	Au.....	10	40	104	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard 1200, 1, 2.....	1935	8-3/16x5	.004	30B.....	10B.....	.004H .006H	(t) CA-J8-K7.....	.025	6B.....	2B.....	.020	Au.....	8	20	110	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard 1203, 4, 5-Super 8.....	1935	8-3/16x5	.004	30B.....	10B.....	.004H .006H	(t) CA-J8-K7.....	.025	6B.....	2B.....	.020	Au.....	10	20	105	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard 1207-8-V12.....	1935	12-3/16x4	.000	TC.....	TC.....	AA.....	(t) AC-K7.....	.025	8B.....	2 1/2B.....	.020	Au.....	10	40	108	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard 120-120A.....	1935	8-3/16x3 7/8	.007	5A.....	2A.....	.007H .009H	A.....	AC-K7.....	.025	5B.....	2B.....	.020	Au.....	7	16 1/2	110	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	1 1/2
Packard 36-120B.....	1936	8-3/16x4 1/2	.006	7B.....	2 1/2B.....	.007H .010H	A.....	CA-J8-K7.....	.029	7B.....	2 1/2B.....	.020	Au.....	7	18	110	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	1 1/2
Packard 8.....	1936	8-3/16x5	.004	30B.....	9 1/2B.....	.004H .006H	(t) CA-J8-K7.....	.029	6B.....	2B.....	.020	Au.....	8	20	110	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard Super 8.....	1936	8-3/16x5	.004	30B.....	9 1/2B.....	.004H .006H	(t) CA-J8-K7.....	.029	6B.....	2B.....	.020	Au.....	9 1/2	22	110	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Packard Twelve.....	1936	12-3/16x4 1/2	.004	TC.....	TC.....	AA.....	(t) CA-J8-K7.....	.029	8B.....	2 1/2B.....	.020	Au.....	10	40	110	2 1/2	1 1/4	3 1/4	1 1/2	0-1/8	9	
Pierce-Arrow 133.....	1929-30	8-3/16x4 1/2	.010	5A.....	1 1/2A.....	.003H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.017	A.....	9	26	76	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 143.....	1929-30	8-3/16x4 1/2	.010	5A.....	1 1/2A.....	.003H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.017	A.....	9	26	76	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow A.....	1930-31	8-3/16x5	.010	5A.....	1 1/2A.....	.003H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.018	A.....	9	26	77	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow B.....	1930-31	8-3/16x4 1/2	.010	5A.....	1 1/2A.....	.003H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.018	A.....	9	26	77	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow C.....	1930-31	8-3/16x4 1/2	.010	5A.....	1 1/2A.....	.003H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.018	A.....	9	26	77	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 41.....	1931	8-3/16x5	.010	5A.....	1 1/2A.....	.004H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.018	A.....	9	26	77	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 42.....	1931	8-3/16x5	.010	5A.....	1 1/2A.....	.004H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.018	A.....	9	26	77	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 43.....	1931	8-3/16x4 1/2	.010	5A.....	1 1/2A.....	.004H .006H	A.....	Ch-C4.....	.025	8 1/2B.....	2 1/2B.....	.018	A.....	9	26	77	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 54.....	1932	8-3/16x4 1/2	.004	5B.....	1 1/2B.....	.004H .006H	A.....	Ch-C4.....	.022	8B.....	2 1/2B.....	.018	A.....	9	26	76	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 52-V12.....	1932	12-3/16x4	.004	4B.....	1 1/2B.....	.004H .006H	A.....	Ch-N2.....	.022	8B.....	2 1/2B.....	.018	A.....	10	38	76	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 53-V12.....	1932	12-3/16x4	.004	4B.....	1 1/2B.....	.004H .006H	A.....	Ch-N2.....	.022	8B.....	2 1/2B.....	.018	A.....	10	38	76	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 836.....	1933	8-3/16x4 1/2	.000	5A.....	1 1/2A.....	AA.....	A.....	Ch-C4.....	.025	5B.....	1 1/2B.....	.018	A.....	9	26	89	2 1/2	1 1/4	2-2 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 1236-V12.....	1933	12-3/16x4	.000	19B.....	6B.....	AA.....	A.....	Ch-N2.....	.023	5B.....	1 1/2B.....	.018	A.....	10	38	99	2 1/2	1 1/4	2-2 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 1242 1247-V12.....	1933	12-3/16x4	.000	19B.....	6B.....	AA.....	A.....	Ch-N2.....	.023	5B.....	1 1/2B.....	.018	A.....	10	38	99	2 1/2	1 1/4	2-2 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 840A.....	1934	8-3/16x5	.000	5A.....	1 1/2A.....	AA.....	A.....	Ch-J5.....	.023	FM.....	FM.....	.018	A.....	9	26	83	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 1240A-48A.....	1934	12-3/16x4	.000	19B.....	6B.....	AA.....	A.....	Ch-J5.....	.023	FM.....	FM.....	.018	A.....	10	38	100	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 836A.....	1934	8-3/16x4 1/2	.006	5B.....	1 1/2B.....	.004 .006	A.....	Ch-J5.....	.023	FM.....	FM.....	.020	A.....	9	26	83	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 845.....	1935	8-3/16x5	.010	5A.....	1 1/2A.....	AA.....	A.....	Ch-J5C.....	.023	4B.....	1 1/2B.....	.018	A.....	9	28	80	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 1245-55-V12.....	1935	12-3/16x4	.004	19B.....	5B.....	AA.....	A.....	Ch-J5.....	.023	5B.....	1 1/2B.....	.018	A.....	12	40	85	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 1601.....	1936	8-3/16x5	.010	5A.....	1 1/2A.....	AA.....	A.....	Ch-U6.....	.025	2B.....	B.....	.018	A.....	9	25	80	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 1602.....	1936	12-3/16x4	.004	19B.....	6B.....	AA.....	A.....	AC-14mm.....	.025	5B.....	1 1/2B.....	.018	A.....	11	38	85	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Pierce-Arrow 1603.....	1936	12-3/16x4	.004	19B.....	6B.....	AA.....	A.....	AC-14mm.....	.025	5B.....	1 1/2B.....	.018	A.....	11	38	85	2 1/2	1 1/4	1-1 1/2L ¹¹	1 1/2-1 1/2	1/8-1/8	8
Plymouth Q.....	1928-29	4-3/8x4 1/2	.008	5A.....	1 1/2A.....	.004H .006H	A.....	AC-A.....	.028	.050B.....	3 1/2B.....	.020	A.....	4	14	68	1 1/2	1 1/4	0-2E	0-2	1/8-1/8	7
Plymouth U.....	1929-30	4-3/8x4 1/2	.008	5A.....	1 1/2A.....	.004H .006H	A.....	AC-A.....	.028	.050B.....	3 1/2B.....	.020	A.....	4	14	68	1 1/2	1 1/4	1-2	1-2	1/8-1/8	7
Plymouth 30U.....	1930-31	4-3/8x4 1/2	.008	6A.....	2A.....	.005H .007H	A.....	AC-G12.....	.022	.050B.....	3 1/2B.....	.020	A.....	6	10	68	2	1 1/2	1 1/2-2	2	1/8-1/8	7
Plymouth PA.....	1931-32	4-3/8x4 1/2	.008	6A.....	2A.....	.005H .007H	A.....	AC-G12.....	.028	10 1/2B.....	3 1/2B.....	.020	A.....	6	14 1/2	74	2	1 1/2	1-3	1-3	1/8-1/8	7
Plymouth PB.....	1932	4-3/8x4 1/2	.008	6A.....	2A.....	.005H .007H	A.....	AC-S9.....	.028	10B.....	3B.....	.020	A.....	6	14 1/2	74	2	1 1/2	1-3	1-3	1/8-1/8	7
Plymouth PC & PC-Std.....	1933	6-3/16x4 1/2	.011	6A.....	2 1/2A.....	.007H .009H	A.....	AC-S9.....	.025	(I).....	(I).....	.020	A.....	5	13	90	1 1/2	1 1/4	1-3	1		

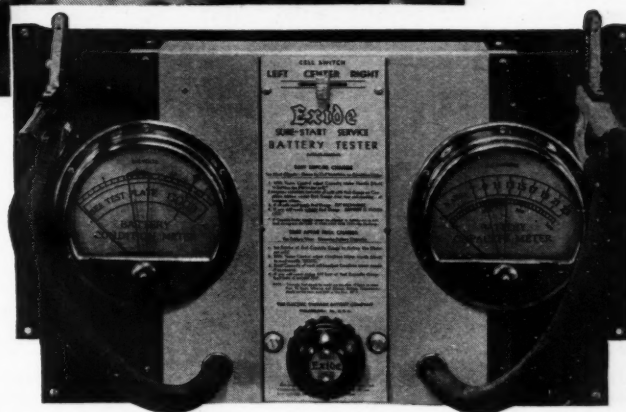
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Tune Up Specifications—(1928 to 1936 Inclusive)—Continued

MAKE AND MODEL		No. of Cylinders and Bore and Stroke	VALVES				IGNITION								Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lbs.) (Standard Head)	CRANK-PIN		FRONT AXLE					
			Inlet Tappet Clearance for Valve Timing	Intake Valve Opens Before or After T. C.		Operating Tappet Clearance	Rods Removed from	Spark Plug		Timing (1000ths of Inch Indicates Piston Travel)				Capacity Crank Case (Qts.)				Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lbs.) (Standard Head)	Diameter	Length	Caster (Degrees)	Camber (Degrees)	Toe-in (Inches)	Kingpin Inclination (Degrees)
				No. of Degrees (E=Exhaust Valve)	No. of Flywheel Teeth (E=Exhaust Valve)			Intake	Exhaust	Make and Model	Gap	Spark Occurs	No. of Flywheel Teeth Spark Occurs TC												
Lincoln KA-Ser. 521-V12	1934	12-3 1/4 x 4 1/2	.003	21B	7B	.003C	.005C	B.	Ch-7	.022	7B	2 1/4 B.	.020	A.	13	32	101	2 1/2	2	1	1	0-1/8	7 1/2		
Lincoln KB-Ser. 271-V12	1934	12-3 1/4 x 4 1/2	.003	21B	7B	.003C	.005C	B.	Ch-7	.022	7B	2 1/4 B.	.020	A.	13	32	101	2 1/2	2	1	1	0-1/8	7 1/2		
Lincoln 301 & 541-V12	1935	12-3 1/4 x 4 1/2	.004	21B	6 1/2 B.	.004C	.006C	A.	Ch-7	.022	7B	2 1/4 B.	.020	Au.	12	32	90	2 1/2	2	1 1/2	1	0-1/8	7 1/2		
Lincoln V12	1936	12-3 1/4 x 4 1/2	.004	21B	6 1/2 B.	.004C	.006C	B.	Ch-7	.022	7B	2 1/4 B.	.020	Au.	12	32	105	2 1/2	2	1 1/2	1	0-1/8	7 1/2		
Lincoln V12-Zephyr	1936	12-2 3/4 x 3 3/4	.012	19 1/2 B.	6 1/2 B.	.012	.012	A.	Ch-J9	.025	4B	1 1/4 B.	.015	Au.	6	27	114	2 1/2	1 1/2	7	3/4	1 1/8-1 3/8	8 1/4		
Marmon N-78	1928-29	8-2 1/4 x 4	.013	6B.	1 1/2 B.	.008H	.008H	B.	Ch-2	.027	7 1/2 B.	2B.	.021	A.	7	22	80	2 1/2	(s)	4 1/2 E	1 1/2	0-1/8	7		
Marmon N-68	1929	8-2 1/4 x 4 1/2	.012	6B.	1 1/2 B.	.008H	.008H	B.	Ch-2	.027	7 1/2 B.	1 1/2 B.	.021	A.	7	22	80	2	1 1/2	4 1/2 E	1 1/2	0-1/8	7		
Marmon Roosevelt 8	1930	8-2 1/4 x 4 1/2	.010C	6B.	1 1/2 B.	.008H	.008H	B.	Ch-2	.027	7B	1 1/2 B.	.020	A.	7	16	80	2	1 1/2	4 1/2 E	1 1/2	0-1/8	7		
Marmon 69	1930	8-2 1/4 x 4 1/2	.010C	6B.	1 1/2 B.	.008H	.008H	B.	Ch-8	.025	7B	1 1/2 B.	.022	A.	7	16	83	2	1 1/2	4 1/2 E	1 1/2	0-1/8	7		
Marmon 79	1930-31	8-3 1/4 x 4 1/2	.010C	TC	TC	.008H	.008H	B.	Ch-8	.025	5 1/2 B.	1 1/2 B.	.022	A.	10	28	89	2 1/2	1 1/2	3 1/2 E	1 1/2	0-1/8	7		
Marmon Big 8	1930-31	8-3 1/4 x 4 1/2	.010C	TC	TC	.008H	.008H	B.	Ch-8	.025	5 1/2 B.	1 1/2 B.	.022	A.	10	28	89	2 1/2	1 1/2	3 1/2 E	1 1/2	0-1/8	7		
Marmon 88	1931	8-3 1/4 x 4 1/2	.010	TC	TC	.008H	.008H	B.	Ch-8	.025	5 1/2 B.	1 1/2 B.	.022	A.	10	28	89	2 1/2	1 1/2	3 1/2 E	1 1/2	0-1/8	7		
Marmon 70	1931-32	8-2 1/4 x 4 1/2	.010	6B.	1 1/2 B.	.008H	.008H	B.	Ch-8	.025	7 1/2 B.	2B.	.020	A.	6	16	89	2	1 1/2	4 1/2 E	1 1/2	0-1/8	7		
Marmon 16-V16	1931-32	16-3 1/4 x 4 1/2	.014	6B.	2B.	.008H	.008H	B.	Ch-C7	.022	6B.	2B.	.019	A.	10	34	99	2 1/2	1 1/2	3 1/2 E	1 1/2	0-1/8	7		
Marmon 125	1932	8-3 1/4 x 4 1/2	.010	TC	TC	.008H	.008H	B.	Ch-8	.025	5 1/2 B.	1 1/2 B.	.022	A.	10	28	91	2 1/2	1 1/2	3 1/2 E	1 1/2	0-1/8	7		
Marquette 30-Early	1930	6-3 1/4 x 4 1/2	.010	5B.	1 1/2 B.	.006H	.006H	B.	AC-G12	.026	5B.	1 1/2 B.	.018	A.	6	12	80	2 1/2	1 1/2	1 1/2-2 1/4 E	1-2	1/8-1 1/2	9 1/2		
Marquette 30-Late	1930	6-3 1/4 x 4 1/2	.010	5B.	1 1/2 B.	.006H	.006H	B.	AC-G12	.026	7B.	2B.	.018	A.	6	12	80	2 1/2	1 1/2	1 1/2-2 1/4 E	1-2	1/8-1 1/2	9 1/2		
Nash Ser. 320-Standard 6	1928	6-3 1/4 x 4	.005	5A.	1 1/4 A.	.007H	.007H	A.	AC-A	.025	FM.	FM.	.020	Au.	5	10	65	1 1/2	1 1/2	1 1/2-1 L ²	1 1/2	1/8	0		
Nash 360-Adv. 6	1928	6-3 1/4 x 5	.012	15A.	5A.	.012H	.012H	B.	AC-C	.025	VDM	VDM.	.022	Re.	8	23	72	2 1/2	1 1/2	1 1/2-1 L ²	1 1/2	1/8	0		
Nash Ser. 420-Standard 6	1929	6-3 1/4 x 4	.007	5A.	1 1/4 A.	.008H	.008H	A.	AC-G14	.020	FM.	FM.	.020	Au.	5	10	75	1 1/2	1 1/2	2 L ²	0-2	1/8	6		
Nash 430-Special 6	1929	6-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-J9	.020	VDM.	VDM.	.020	Au.	7	17	78	2 1/2	1 1/2	2 L ²	0-1 1/2	1/8	6		
Nash 460-Adv. Twn. Ign. 6	1929	6-3 1/4 x 5	.012	15A.	5A.	.012H	.012H	B.	AC-J9	.025	VDM.	VDM.	.022	Au.	8	19	75	2 1/2	1 1/2	2 L ²	0-1 1/2	1/8	6		
Nash 450-Single Six	1930	6-3 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G14	.020	FM.	FM.	.020	Au.	5	12	75	1 1/2	1 1/2	2 L ²	0-2	1/8	7		
Nash 480-Twn. Ign. 6	1930	6-3 1/4 x 4 1/2	.012	15A.	5A.	.012H	.012H	B.	AC-G14	.020	15B.	5B.	.020	Au.	6	16	75	2 1/2	1 1/2	1 L ²	0-1 1/2	1/8	6		
Nash 490-Twn. Ign. 8	1930	8-3 1/4 x 4 1/2	.012	15A.	5A.	.012H	.012H	B.	AC-J9	.020	VDM.	VDM.	.020	Au.	8	22	82	2 1/2	1 1/2	0 L ²	0-1 1/2	1/8	6		
Nash 660-Standard 6	1931	6-3 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G14	.020	FM.	FM.	.020	Au.	5	12	75	1 1/2	1 1/2	2 L ²	0-1 1/2	1/8	6		
Nash 870	1931	8-2 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G14	.020	FM.	FM.	.022	Au.	6	15	75	1 1/2	1 1/2	2 L ²	0-1 1/2	1/8	7		
Nash 880-Twn. Ign. 8	1931	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-J9	.020	VDM.	VDM.	.020	Au.	8	16 1/2	82	2	1 1/2	2 L ²	0-1 1/2	1/8	6		
Nash 890-Twn. Ign. 8	1931	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-J9	.020	VDM.	VDM.	.020	Au.	10	22	82	2 1/2	1 1/2	0 L ²	0-1 1/2	1/8	6		
Nash 960	1932	6-3 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G14	.020	FM.	FM.	.022	Au.	5	12	75	1 1/2	1 1/2	2 L ²	0-1 1/2	1/8	7		
Nash 970	1932	8-2 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G14	.020	FM.	FM.	.022	Au.	6	15	75	1 1/2	1 1/2	2 L ²	0-1 1/2	1/8	7		
Nash 980-Twn. Ign. 8	1932	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-K12	.020	15B.	4 1/2 B.	.020	Au.	8	20	82	2	1 1/2	2 L ²	0-1 1/2	1/8	6		
Nash 990-Twn. Ign. 8	1932	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-J9	.020	VDM.	VDM.	.020	Au.	10	22	82	2 1/2	1 1/2	0 L ²	0-1 1/2	1/8	6		
Nash 1060-Big Six	1932	6-3 1/4 x 4 1/2	.008	5 1/2 A.	1 1/4 A.	.008H	.008H	A.	AC-G10	.020	5B.	VDM.	.020	Au.	6	15	75	1 1/2	1 1/2	2 L ²	0-1 1/2	1/8	6		
Nash 1080-Special 8	1932	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-K12	.020	15B.	4 1/2 B.	.025	A.	8	21	75	1 1/2	1 1/2	0	0-1 1/2	1/8	6		
Nash 1090-Adv. Twn. Ign. 8	1932	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-J9	.020	VDM.	VDM.	.020	Au.	10	22	82	2 1/2	1 1/2	0	0-1 1/2	1/8	6		
Nash 1070-Standard	1932	8-3 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G10	.020	5A.	1 1/2 A.	.022	Re.	7	17	75	1 1/2	1 1/2	2 1/2	0-1 1/2	1/8	7		
Nash 1170-Special 8	1933	8-3 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G10	.020	5A.	1 1/2 A.	.022	Re.	7	17	75	1 1/2	1 1/2	2 1/2	0-1 1/2	1/8	7		
Nash 1120-Big Six	1933	6-3 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-K12	.020	10B.	3B.	.020	Au.	7	19	84	2	1 1/2	2 1/2	0-1 1/2	1/8	7		
Nash 1130-Standard 8	1933	8-3 1/4 x 4 1/2	.008	5A.	1 1/4 A.	.008H	.008H	A.	AC-G10	.020	10B.	3B.	.022	Re.	7	16	84	1 1/2	1 1/2	2 1/2	0-1 1/2	1/8	7		
Nash 1180-Adv. Twn. Ign. 8	1933	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-K12	.020	VDM.	VDM.	.025	A.	8	21	80	2 1/2	1 1/2	0	0-1 1/2	1/8	6		
Nash 1190-Amb. Twn. Ign. 8	1933	8-3 1/4 x 4 1/2	.012	15A.	4 1/4 A.	.012H	.012H	B.	AC-J9	.020	VDM.	VDM.	.020	Au.	10	22	80	2 1/2	1 1/2	0	0-1 1/2	1/8	6		
Nash 1220-Big Six Twn. Ign.	1934	8-3 1/4 x 4 1/2	.015			.015H	.015H	A.	AC-K12	.022	VDM.	VDM.	.020	Au.	7	17 1/2	82	2 1/2	1 1/2	2 1/2	0-1 1/2	1/8	7		
Nash 1280-Adv. Twn. Ign. 8	1934	8-3 1/4 x 4 1/2	.015			.015H	.015H	A.	AC-K12	.022	VDM.	VDM.	.020	Au.	8	21	82	2 1/2	1 1/2	2 1/2	0-1 1/2	1/8	7		
Nash 1290-Amb. Twn. Ign. 8	1934	8-3 1/4 x 4 1/2	.015			.015H</																			

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Tune Up Specifications—(1928 to 1936 Inclusive)—Continued

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES				Rods Removed from	IGNITION						Capacity Crank Case (Qts.)	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lbs.) (Standard Head)	CRANK-PIN		FRONT AXLE				
		Inlet Tappet Clearance for Valve Timing	Intake Valve Opens Before or After T. C.		Operating Tappet Clearance		Spark Plug		Timing (1000ths of Inch Indicates Piston Travel)		Breaker Gap	Breaker Housing				Diameter	Length	Caster (Degrees)	Camber (Degrees)	Toe-in (Inches)	Kingpin Inclination (Degrees)	
			No. of Degrees (E=Exhaust Valve)	No. of Flywheel Teeth (E=Exhaust Valve)	Intake		Exhaust	Make and Model	Gap	Spark Occurs at TC												No. of Flywheel Teeth Spark Occurs TC
Studebaker GJ-Com. 1936	6-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	AB	Ch-2	.025	TC	.020	3/4A	8	17	72	2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker FD-Com. 1929-30	8-3 1/2 x 4 1/2	.010	TC	TC	.004H	.006H	A	Ch-2	.025	7B	.021	2B	8	21	78	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker FE & FH-Pres. 1929-30	8-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	A	Ch-2	.026	8B	.021	2B	8	21	89	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker GL-Dictator 1930	6-3 1/2 x 4 1/2	.010	5A	1 1/2A	.006H	.006H	AB	Ch-2	.025	TC	.020	3/4A	8	15	72	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 6-53 & Dy.Ersk.53. 1930-31	6-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	AB	Ch-C4	.025	TC	.020	3/4A	8	12 1/2	80	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker FC-Dictator 1930-31	8-3 3/4 x 3 3/4	.010	TC	TC	.004H	.006H	A	Ch-2	.025	9B	.021	2B	8	15	76	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 6-54 1931	6-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	AB	Ch-2	.025	5B	.021	2B	8	15	80	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-61 1931	8-3 1/2 x 3 3/4	.010	TC	TC	.004H	.006H	A	Ch-2	.025	9B	.021	2B	8	15	76	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-70-Com. 1931	8-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-2	.025	7B	.020	2A	8	19	80	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-80-President. 1931	8-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	A	Ch-2	.025	8B	.020	2A	8	21	78	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-90-President. 1931	8-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	A	Ch-2	.025	8B	.020	2A	8	21	78	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 6-55 1932	6-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	B	Ch-2	.025	5B	.021	2A	7	12 1/2	76	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-62-Dictator. 1932	8-3 1/2 x 3 3/4	.010	TC	TC	.04H	.006H	A	Ch-2	.025	9B	.020	2A	8	14	76	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-71-Com. 1932	8-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-2	.025	9B	.020	2A	8	16	89	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-91-President. 1932	8-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	A	Ch-2	.025	9B	.020	2A	8	21	78	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 6-56 1933	6-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	B	Ch-8	.025	TC	.020	2A	7	14	89	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	8	
Studebaker 8-73-Com. 1933	8-3 1/2 x 4	.010	15B	4 1/2B	.004H	.006H	A	Ch-2	.025	4B	.020	2A	8	16	98	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-82-President. 1933	8-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-8	.025	4B	.020	2A	8	16	98	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker 8-92-President. 1933	8-3 1/2 x 4 1/2	.010	5A	1 1/2A	.004H	.006H	A	Ch-8	.025	TC	.020	2A	8	23	76	2 1/2	1 1/2	1/4-3/4E	0-1	1-1/8	8	
Studebaker A-Dictator 1934	6-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-7	.025	TC	.020	2A	5	15.6	105	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	9 1/2	
Studebaker B-Commander. 1934	8-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-7	.025	TC	.020	2A	5	15.4	105	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	8	
Studebaker C-President. 1934	8-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-7	.025	TC	.020	2A	5	15.4	105	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	8	
Studebaker 1A & 2A-Dict. 1935	6-3 1/2 x 4 1/2	.010	5B	1 1/2B	.004H	.006H	A	Ch-7	.027	TC	.020	2A	5	16 1/2	105	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	8 1/2	
Studebaker 1B-Commander. 1935	8-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-8	.025	TC	.020	2A	5	16 1/2	99	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	9 1/2	
Studebaker 1C 1935	8-3 1/2 x 4 1/2	.010	15B	4 1/2B	.004H	.006H	A	Ch-8	.025	TC	.020	2A	5	16 1/2	110	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	9 1/2	
Studebaker Dictator 6 1936	6-3 1/2 x 4 1/2	.020	15B	1 1/2VDM	.016C	.016C	A	Ch-SS	.025	2B	.020	2A	6	14	105	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	9 1/2	
Studebaker Dict. Plan. 1936	6-3 1/2 x 4 1/2	.020	15B	1 1/2VDM	.016C	.016C	A	Ch-SS	.025	2B	.020	2A	6	14	105	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	9 1/2	
Studebaker President 8 1936	8-3 1/2 x 4 1/2	.020	15B	5 1/2B	.016C	.016C	A	Ch-SS	.025	TC	.020	2A	8	17.6	105	2 1/2	1 1/2	1-1 1/2E	0-1	1-1/8	9 1/2	
Terraplane K 1932	6-2 1/2 x 4 1/2	.006	11B	3 1/2B	.006H	.008H	B	AC-K9	.025	TC	.020	2A	6	17	95	1 1/2	1 1/2	3E	2	0-1/8	7	
Terraplane K 1933	6-2 1/2 x 4 1/2	.006	11B	3 1/2B	.006H	.008H	B	AC-K9	.025	TC	.020	2A	6	12	95	1 1/2	1 1/2	3E	2	0-1/8	7	
Terraplane KT 1934	8-2 1/2 x 4 1/2	.006	11B	3 1/2B	.006H	.008H	B	Ch-K9	.025	TC	.020	2A	8	16	95	1 1/2	1 1/2	2 1/2-3 1/2	2	0-1/8	7	
Terraplane K & KS 1934	6-3 x 5	.010	10 1/2	3B	.006H	.008H	A	Ch-J7	.022	TC	.020	2A	6	18	93	1 1/2	1 1/2	2 1/2-3 1/2	2	0-1/8	7	
Terraplane KU 1934	6-3 x 5	.010	10 1/2	3 1/2B	.006H	.008H	A	Ch-J7	.022	TC	.020	2A	6	18	93	1 1/2	1 1/2	2 1/2-3 1/2	2	0-1/8	7	
Terrap. G-Spec. & GU-Del. 1935	6-3 x 5	.010	10 1/2	3 1/2B	.006H	.008H	A	Ch-J7	.025	TC	.020	2A	6	18	103	1 1/2	1 1/2	3 1/2-4 1/2	2	1-1/2	7	
Terraplane Del. & Cust. 6 1936	6-3 x 5	.010	10 1/2	4B	.006H	.008H	A	Ch-J8	.022	TC	.020	2A	6	13	99	1 1/2	1 1/2	3 1/2-4 1/2	2	0-1/8	7	
Viking V29 & V30 1930	8-3 3/8 x 3 3/8	.010	1 1/2B	1 1/2B	.008H	.010H	A	AC-G12	.026	1 1/2B	.022	2A	7	32	78	2	1 1/2	3L 1/2	2	1/8	7	
Whippet 96A 1929-30-31	4-3 1/2 x 4 1/2	.008	7A	1 1/2A	.004H	.006H	B	Ch-C4	.025	FM	.020	2A	5	11	87	1 1/2	1 1/2	1-2E	2	1/8	7 1/2	
Whippet 98A 1930-31	6-3 1/2 x 4 1/2	.008	7A	2A	.004H	.006H	A	Ch-C4	.025	5B	.018	2A	6	12 1/2	79	1 1/2	1 1/2	1-2E	2	1/8	7 1/2	
Willis 8-80 1930	8-3 1/2 x 4	.010	TC	TC	.006H	.008H	A	Ch-8	.025	6B	.018	2A	8	20	82	2 1/2	1 1/2	1-2E	2	1/8	7 1/2	
Willis 98B 1930-31	6-3 1/2 x 3 3/8	.008	7B	2B	.004H	.006H	A	Ch-C7	.025	TC	.018	2A	7	14	91	2	1 1/2	1-2E	2	1/8	7 1/2	
Willis 97 1931	6-3 1/2 x 3 3/8	.008	7B	2B	.004H	.006H	A	Ch-C7	.025	TC	.018	2A	7	14	82	2	1 1/2	1-2E	2	1/8	7 1/2	
Willis 98D 1932	6-3 1/2 x 3 3/8	.008	7B	2B	.004H	.006H	A	Ch-C7	.025	TC	.018	2A	7	14	82	2	1 1/2	1-2E	2	1/8	7 1/2	
Willis 8-80D 1931-32	8-3 1/2 x 4	.010	TC	TC	.006H	.008H	A	Ch-8	.027	6B	.018	2A	8	19 1/2	82	2 1/2	1 1/2	1-2E	2	1/8	7 1/2	
Willis 6-90 1932	6-3 1/2 x 3 3/8	.008	7B	2 1/2B	.004H	.006H	A	Ch-8	.025	TC	.018	2A	7	13 1/2	82	2	1 1/2	1-2	2	1/8	7 1/2	
Willis 8-88 1932	8-3 1/2 x 4	.010	TC	TC	.006H	.008H	A	Ch-8	.027	6B	.018	2A	8	19 1/2	82	2 1/2	1 1/2	1-2	2	1/8	7 1/2	
Willis 6-90A 1933	6-3 1/2 x 3 3/8	.008	7B	2 1/2B	.004H	.006H	A	Ch-8	.025	TC	.018	2A	7	13 1/2	82	2	1 1/2	1-2	2	1/8	7 1/2	
Willis 8-88A 1933	8-3 1/2 x 4	.010	TC	TC	.006H	.008H	A	Ch-8	.027	6B	.018	2A	8	19 1/2	82	2 1/2	1 1/2	1-2	2	1/8	7 1/2	
Willis 77 1933-34-35	4-3 1/2 x 4 1/2	.010	TC	TC	.004H	.006H	A	Ch-7	.025	4B	.018	2A	4	9	83	1 1/2	1 1/2	1-2	2	1/8	7 1/2	
Willis 77 1936	4-3 1/2 x 4 1/2	.010	TC	TC	.004H	.006H	A	Ch-C7	.025	5A	.018	2A	4	9	93	1 1/2	1 1/2	1-2	2	1/8	7 1/2	
Willis-Knight 66A-Gr. 6 1928-29	6-3 1/2 x 4 1/2	SV	10A	3A	SV	SV	B	Ch-C4	.025	12B	.018	2A	8	21	76	2 1/2	1 1/2	1-2E	2 1/2	1/8	8	
Willis-Knight 70B 1929-30	6-2 1/2 x 4 1/2	SV	5A	1 1/2A	SV	SV	B	Ch-C1	.025	8B	.018	2A	8	17	89	2	1 1/2	1-2E	2	1/8	7 1/2	
Willis-Knight 66B 1930-31	6-3 1/2 x 4 1/2	SV	5A	1 1/2A	SV	SV	B	Ch-C4	.025	16B	.018	2A	8	21	89	2 1/2						

ABBREVIATIONS:

*—Denotes Indices or markings on Flywheel
 †—At 1000 R.P.M.
 ††—Before Engine No. 16E—19,140
 †††—After Engine No. 16E—19,140
 (a)—1 1/2B before Engine No. 9437
 (b)—2 1/2B after Engine No. 9437
 A—Advanced (Breaker housing)
 A—Above (Pistons removed from)
 AA—Automatic adjustment (Valves)
 AB—Some above and some below
 AC—Air cooled
 AC—AC Spark Plug Co.



Symbol of Money to be Made!

HERE you see an emblem which is proudly displayed on showroom walls and windows and over the service station entrances of successful dealerships all over the country . . . It is a sign of profitable business being built on a permanent basis. It is a symbol of money being made and of money to be made . . . This emblem is such a sign and symbol primarily because it is the exclusive mark of Oldsmobile cars. Every day

and every season, now, sees new hundreds and thousands of these quality cars in the service of a large and loyal owner family—a market that is constantly expanding . . . To the Oldsmobile dealer, this symbol also signifies friendly relations between dealer and factory, helpful and aggressive factory support in all phases of their operations and a Franchise that is notable for soundness and fairness and profit-making possibilities.

OLDSMOBILE



HARRY HARTZ describes his exploits to the fair ladies (left), after a recent record-breaking cross-country run. Another across the continent driver is **J. P. Ozman** (right) who piloted this 1900 Holzman from Akron, O., to Los Angeles in 26 days.

Thermoid Custom-Built Brake Lining Sets Certified by Pittsburgh Laboratory

Thermoid, of Trenton, has had an independent testing laboratory run thorough road tests on Thermoid brake linings to prove their effectiveness. Their certification of tests has been placed on all sets that proved to be correct for the particular cars for which they are recommended. This certification enables jobbers and dealers to convince their customers that the set is correct for the specific car.

The sets on which this plan is employed are the 1936 Thermoid Custom-Built Sets. These sets were perfected by Thermoid after running 350,000 test-miles with various combinations of lining materials on all different types of brakes. After the Thermoid engineers had developed the sets it was decided to check their findings by having an unbiased research organization test the sets by their own thorough unprejudiced methods.

Pittsburgh Testing Laboratory was chosen because it has conducted tests on many other automotive products—gears, axles, gasoline, anti-freeze, bearing metals, etc.

Briefly, the procedure was as follows: The Pittsburgh Testing Laboratory engineer selected from Thermoid's warehouse or production stocks the sets to be tested on all cars in the test fleet. These were installed under his supervision on the different cars, in accordance with Thermoid's instruction charts. When final adjustments had been made, he applied lead seals on each job, so there could be no chance of changing the linings or adjustments until tests were completed.

On each car five series of tests were made at specified intervals: three series of deceleration tests, a fade-out test, and a test for recovery from fade-out.

Between tests the cars were driven day and night in all kinds of weather and over a specified route which hit all kinds of city and country traffic conditions.

Their engineers also spent time in Trenton to study all the processes involved in making Thermoid Custom-Built Brake Lining Sets. This was to

determine whether factory methods, equipment, and personnel were such that uniformity would be secured in the product.

All data recorded by the testing engineers in Trenton was checked carefully by the laboratory staff and executives in Pittsburgh.

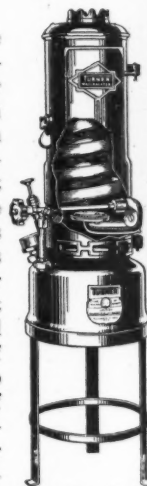
The report concluded with a special authorization to use the Pittsburgh Testing Laboratory certificate on the complete line-up of Thermoid Custom-Built Sets. This certificate of tests is reproduced on every carton containing a Thermoid Custom-Built Set.

Buffalo Clinic

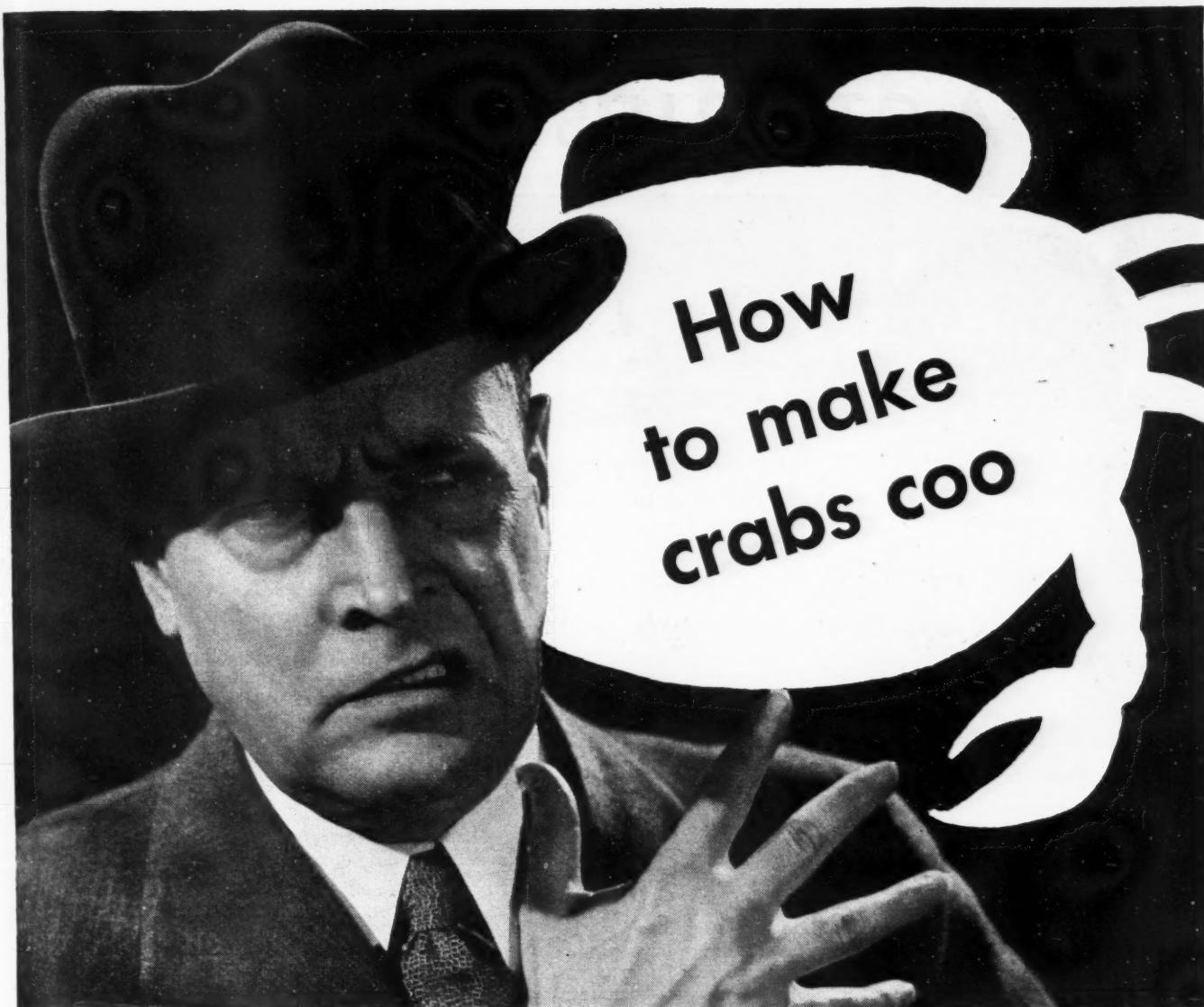
Ten Buffalo wholesalers, organized as Buffalo Automotive Distributors, Inc., will conduct a cooperative Automotive Equipment and Parts Show in the Broadway Auditorium April 21-24, according to Carlton C. Proctor, show manager and secretary.

Turner Brass Announces Gasoline Water Heater

The Turner gasoline water heater is designed particularly for car washing, and can be used in connection with any standard galvanized water tank. It is said to give the same performance as a gas water heater and was primarily designed for use where gas is not available. The fuel tank holds a gallon of gasoline, sufficient to heat 200 gallons of water. The flame is adjustable for slow or fast heating. A product of the Turner Brass Works, Park Ave., Sycamore, Ill., this heater retails for \$17.



A PITTSBURGH Testing Laboratory engineer inspects the installation and adjustment of Thermoid linings on test cars, during a laboratory study and certification of Thermoid Custom-Built Sets.



YOU'VE met him. A chronic crab. Give him the slightest grounds for a squawk about his new car and he'll let out a moan they can hear in Frisco.

Fortunately there are few of his kind, but even one kicker can kill a dozen or so potential sales.

So it's good business to do everything in your power to see that every potential kicker becomes an enthusiastic booster. Which means, among others, doing two things.

First . . . fill the crankcase of every car you deliver with the world's finest motor oil, *Gulfpride*. This 100% Pure Pennsylvania oil will do more to keep a good motor in good shape than any other oil made. It forms far less sludge and gum—and has actually lubricated automobile motors for 80,000 miles without any need of removing carbon!

Second . . . load the tank with *Gulf No-Nox Ethyl, Aviation Grade Gasoline*.

It adds zip to a fast car, gives it even more pick-up, power and pep . . . and helps you transform a natural doubting Thomas into an extreme enthusiast.

Get the complete story how Gulf can help you make car owners happier and sprout new sales for you. Also get a FREE supply of those popular Gulf booklets, "15 Ways to Save Gasoline Money"—to pass out to all your customers. The coupon will turn the trick. Mail it—today.



GULF OIL CORPORATION
OF PENNSYLVANIA

GULF REFINING COMPANY

"HERE'S A MOVE
THAT'S MEANT EXTRA
CUSTOMERS TO HUN-
DREDS OF DEALERS!"



GULF, 3800 Gulf Building, Pittsburgh, Pa.

Gentlemen:

- ☐ Please send full information about your special plan for motor car distributors and dealers.
- ☐ Please send me FREE copies of that booklet so many people ask for, "15 Ways to Save Gasoline Money."

(Check either or both of above wanted, and mail at once.)

Name _____

Street _____

City _____ State _____

MA-46

Repairman's Visit To The

FACTORIES



Tom O. Duggan



L. A. Dall

Tom O. Duggan has been promoted from merchandising director of Thompson Products, Inc., Cleveland, to general manager of the company's service division, according to an announcement by Frederick C. Crawford, president.

* * *

Election of L. A. Dall, president of The Dall Manufacturing Co., Inc., of Cleveland, to a vice-presidency of Aluminum Industries, Inc., Cincinnati, manufacturer of Permite Products, is announced by H. J. Hater, treasurer and general manager of the Cincinnati corporation. Dall, who became associated with Aluminum Industries when the Dall company was consolidated with the former organization, is in charge of all Permite Replacement Parts Sales.

* * *

Leonard F. Ashford has resigned as assistant treasurer and credit manager of Wilkening Manufacturing Co., Philadelphia, to become secretary and general manager of a new company known as Fritsche Motors, Inc., which has taken over the Ford agency previously operated by Paul Kratz, Inc., in Olney, Philadelphia. David Cowhig, comptroller of the Wilkening Manufacturing Co., has been appointed assistant treasurer. Herbert Brooks has been named credit manager.

* * *

Power Brake Sales Corp. has been organized in Richmond, Va., by officials of Motor Parts Corp. of that city to handle distribution of Linderman control brakes for Virginia, North Carolina and District of Columbia. R. E. Free of Motor Parts will also head up the new sales corporation.

* * *

L. J. Miley Co., manufacturers of brake linings and Miley lined brake shoes, have again almost doubled the size of their general sales office in Chicago. The company has purchased the brake band division of the Duro Metal Products Co., also of Chicago.

* * *

Timken-Detroit Axle Co. has dissolved the following previously wholly owned subsidiaries which hereafter will be operated as divisions: Timken

Silent Automatic Co., Wisconsin Axle Co., Michigan Valve & Foundry Co., and the Timken Michigan Co. The latter, a sales company, has been merged with the Michigan Valve division.

* * *

Diesel engines for light marine craft as well as the heavier types are announced by Kermath Mfg. Co. with the introduction of three different models. The engines range from the light type of 79 horsepower to the heavy one of 160 horsepower, according to F. C. Morgan, president.

* * *

Pratt Industries, Inc., has taken over the entire business of the Pratt Chuck Co. of Frankfort, N. Y., and will operate from the same offices and plant. Winthrop T. Scarritt is president and treasurer of the new organi-

zation; George Sicard, vice-president and director of sales; Alexander Pirnie, secretary.

* * *

James A. Tranter, president of the Hill Diesel Engine Co., Lansing, Mich., has announced the appointment of James M. Degnan as general sales manager of the Hill Company effective April 1.

* * *

"Stabilized prices and sound policies in manufacture and distribution" were the highlights in the observations made by A. A. Garthwaite, general manager of Lee Tire & Rubber Co., upon his return to headquarters at Conshohocken, Pa., from a business trip through western and West Coast territories last month.

* * *

Ramsey Accessories Mfg. Corp., St. Louis, Mo., manufacturers of Ramco piston rings, have completed plans and ground has been broken for an extensive addition to its plant. Over 14,000 sq. ft. of floor space will be added to the present plant, and it is expected that the work will be completed by approximately June 1.

* * *

C. W. Isselhardt is now head of the engineering research department of Coil Mfg. Co., 3721 Washington Avenue, St. Louis, Mo., manufacturers of Coil piston rings.

Sunnen Valve Lifter For Ford V-8 Engines

Sunnen Products Co., St. Louis, Mo., has announced a new valve lifter for Ford V-8 engines. Made of extra-



heavy square tubing, it is guaranteed not to bend even when prying out the most stubborn valve assemblies. One end has a large notch for raising the spring, while the other end, with the small notch, is used to hook through the spring coil to apply force to a stuck guide. The retail price of this lifter is \$2.70.

Sinko Supplies Replacements

The Sinko Tool & Mfg. Co., 351 N. Crawford Ave., Chicago, Ill., makers



of wireless cigar lighters have recently introduced a line of replacement elements designed to fit practically all standard units.

Nos. 501 and 549 are the newest elements and are said to incorporate some interesting engineering features. Complete with a spring, they are said to be easy to install.

"What's the cure for compressionitis*?"

***COMPRESSIONITIS:** The common complaint of most cars. *Symptoms:* That knocking sound, accompanied by power loss and waste of gasoline. *Cause:* Failure of gasoline to stand up under the compression of modern engines. *Cure:* See column at right.

HERE'S THE CURE



IN ONLY 37 SECONDS



Your car cannot run without gasoline. Your engine develops power only by compressing and "firing" gas.



The more gasoline is compressed before it is "fired," the greater the power each cylinder develops.



Gasoline which fails under compression causes a "pinging" sound when you accelerate or take a grade. Called "knock," this means loss of power and waste of gas.



To make gasoline stand higher compression, most oil companies add anti-knock fluids (containing tetraethyl lead) made by Ethyl Gasoline Corporation.



Special gasoline for highest compression is sold at pumps marked "Ethyl" on the base or the globe.

At "Ethyl" pumps you get:
• Enough fluid to bring out all the power of the high compression engines of modern cars—and to put new life in older cars.

✓ All-round quality that is doubly checked—by the oil companies and the Ethyl Gasoline Corporation—at the refinery and at the pump.



Down to 2¢ a gallon over regular gasoline—far above it in anti-knock (high compression) value.



Get more power from each gallon you buy! Make the most of your car-investment!

NEXT TIME SELL ETHYL

Marion Wins Daytona Race

(Continued from page 31)

sand and on almost every lap, after the tenth, the drivers' heads could be seen bobbing out of car windows in search for a passable route.

The greatest variety of thrills dished out in a speed event in a long time was the reward of the thousands who jammed the course and filled the grandstands to capacity. Cars literally nose-dived, left the ground and all sorts of maneuvers in their battle against the "sand pits." No serious accidents resulted.

On the tenth lap, the first car was out of the grind. It was a Chevrolet

Stock Car Races Within Last 5 Years					
Date	Place	Distance	Driver	Car	Miles per Hr.
Aug. 26, 1933	Elgin, Ill.	203 miles	Fred Frame	Ford	80.22
Feb. 18, 1934	Mines Airport, Glendale, Cal.	250 miles	"Stubby" Stubblefield	Ford	62.367
April 15, 1934	Targa Florio, at Ascot Spdwy., Los Angeles, Cal.	150 miles	Lou Meyer	Ford	51.333
May 6, 1934	Oakland (Cal.) Spdwy.	250 miles	Lou Meyer	Ford	77.689

driven by B. J. Gibson. Next was Bill Cummings, one of the favorites, driving an Auburn Supercharged, who quit on the sixteenth lap, then

scratched was Bob Sall, another favorite, driving a Ford V-8. Sall "took the count" on the twenty-fourth lap.

So successful was the recent Daytona classic that officials there are considering another event of this type, for the 1937 racing season.

The Daytona stock car race was unique in many respects. The cars were started on a handicap basis with the slowest cars in qualifications getting a start on the field at race time; therefore, the fast cars were required to pick up the distance during the race. Only strictly stock cars of standard manufacture were allowed. Technical representatives of the Contest Board of the A.A.A. inspected the cars before the race start to determine their stock status. Standard tires, fuel, plugs, and all accessories were compulsory.

BURGESS-NORTON MFG. CO.

Charter

Ess-A-E

B-N

Geneva, Ill.



Mark of Quality on PISTON PINS

SINCE 1920

With the introduction of the first independent manufacture of replacement PISTON PINS by Burgess-Norton, a new standard of accuracy—of precision—of finish was established for this important part.

Thru the years, new machines and new processes have enabled Burgess-Norton to maintain this established leadership, and to adhere, continuously, to the ever increasing strictness of S.A.E. Standards.

Independent repair shops—service shops—will find it most advantageous from the profit and satisfaction angles to standardize on B-N PISTON PINS because they

Make a better job

Insure your jobs (With written certificate)

Are easier to fit

Today, Burgess-Norton is the largest maker of genuine Standard Equipment Piston Pins also selling to the replacement parts jobber.

Insist on your wholesaler supplying you with genuine B-N.—the Piston Pin that established and still maintains the standard of quality for the industry.

**PISTON PINS CLUTCH PLATES
STARTER DRIVES OHIO PISTONS**

PISTON PINS • CLUTCH PLATES • STARTER DRIVES

Zecol Wax Easy to Apply

Zecol wax is said to be easy to apply, all the rubbing being done in the first operation. After it dries it can be wiped off with a dry cloth, and a high lustre results. It is claimed by



the manufacturer to have unusual lasting quality as the lustre will not mar with washing, or in salt air or bright sunlight. Zecol is offered in pint, quart and gallon sizes. It is a product of Zecol, Inc., Milwaukee, Wis.

Full House at K.C.

With a total trade attendance around 15,000, including maintenance men from a radius of 300 miles, and with 191 manufacturers occupying 215 booths, the Midwest Automotive Trade Show in Kansas City, March 25, 26, and 27, established a high mark.



An Important Announcement to Independent Garagemen

NEW LOW PRICES ON GENUINE FORD PARTS

Ask your nearest Genuine Ford Parts Distributor today for the new price list for Independent Garages.

Prices on Genuine Ford Parts, generally, have been reduced. This is especially true of the fast-moving items. This reduction in list prices does not in any way sacrifice the Independent Garageman's net profit on the bulk of his Ford replacement business.

Compare Genuine Ford Parts with parts obtained from other sources—compare them on a basis of price, quality or accuracy in manufacture. Then you will quickly understand why more and more Independent Garagemen use only the

Genuine Ford Parts for replacement in Ford cars and trucks. Although priced as low as inferior parts, their exacting specifications are never changed, except for improvement.

When you install Genuine Ford Parts, you may display the Genuine Ford Parts sign. It will bring you many new Ford customers. The Ford Motor Company appreciates the importance of your co-operation in giving service to Ford owners. That's why you receive complete merchandising assistance when you install Genuine Ford Parts.

Your Ford Parts Distributor will make regular deliveries of the parts you need. Telephone him now.



F O R D M O T O R C O M P A N Y

Moody Tire Inflator Uses Standard Gage

The Moody tire inflator housing holds either a Dill or a Schrader tire gage, and clips onto the Schrader chuck at the end of any air hose. In this device the two tire valve cores are the only valves, and, when clogged, the main valve core can be easily changed without removing any screws. The inflator is said to be ruggedly built to stand abuse, and chromium plated to resist weather. The Model A, which sells for \$8.50, has a range from 10

to 135 lbs. and can be used on balloon and truck tires. The Moody Manufacturing Co. is located at 242 W. 61st St., Chicago.

Chicago Maintenance Show

Surpassing last year's record breaking attendance the 1936 Automotive Maintenance Exhibits, sponsored by the Illinois Automotive Association, on the Navy Pier, Chicago, April 4 to 8, was the Mecca of wholesale and retail maintenance men from Illinois, Indiana, Michigan, Wisconsin, lower Minnesota and Iowa.

Offer American Giant-Lift Hydraulic Jacks

The American Giant-Lift hydraulic bumper jack accommodates all cars. Placed inside the front or rear bumper, the cadmium-plated chain is hooked around the bumper arm, and the hydraulic pump quickly raises the jack to a maximum lift of 15 in. The ram can also be fitted with a head for direct lifting if desired. The jack proper and the base are both made of malleable iron, and are easily locked together or taken apart. The capacity of this unit is 3000 lb.



The American Grinder & Specialty Corp., Milwaukee, Wis., has also improved its line of standard hydraulic jacks by the addition of a carrying and positioning handle to the 7 and 12-ton models, as shown.

Ever Think of Selling TRAVEL COACHES . . . ?



Interior of \$785 model with all mahogany finish, two double beds, stoves, ice box, sink, toilet, etc.

COVERED WAGON Offers You This Amazing Dealer Opportunity . . .

- A YEAR ROUND BUSINESS
- ATTRACTIVE DEALER PROFITS
- NO TRADE-IN PROBLEMS
- NO ADDED INVESTMENT
- EXTENSIVE NATIONAL ADVERTISING

Plenty of people in your neighborhood are thinking of buying camp trailers today. Thousands are writing in for information. They want to know more about owning their own summer camp and traveling home. Here's a business that is at the threshold of a tremendous public buying demand. It offers you a marvelous opportunity to become a leader in the trailer business by handling the products of the world's largest producers of trailer coaches. Get the facts on our money making big discount Covered Wagon dealer franchise—Now! Write, wire or phone.

Retail at \$395—\$785 and \$1185 Complete Detroit

COVERED WAGON COMPANY

371 Cass Avenue, Mt. Clemens, Michigan

C. I. T.
FLOOR PLAN
FINANCING



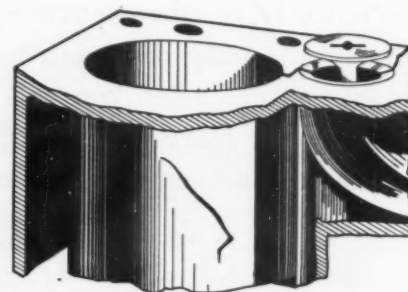
Mr. Safety First

Out in California, a traffic violator was hauled before a judge last month . . . and when asked to give his name, the defendant replied, "Safety First."

"Don't kid me, young man," snapped the judge. "I didn't ask you for a traffic slogan, I asked you for your name."

"That's it—Safety First."

Upon order from the Court, the bailiff investigated the man's identity. His name was—Safety First. Fine was suspended.



ILLUSTRATING how Wonder Weld, a product of The Miller Mfg. Co., Camden, N. J., seals cracks in cylinder blocks. It can be used on valve ports and cylinder heads as well.

"27 YEARS

and no Trouble

...THATS WHY I USE

VICTOR *Copper Asbestos* GASKETS"

*"I've used Victor's for 27 Years," said
Pete C——, skilled mechanic on
Broadway, Chicago—"and never had
any trouble with them. That's why
I stick to Victor's."*

"27 Years" of satisfactory performance with Victor Copper-Asbestos Gaskets, for they SEAL Joints Tight, come off clean and do not stick.

"27 Years" of dependability due to correctness of design, accurate construction and careful workmanship.

"27 Years" of Victor Service — A Nation-Wide Service that includes practically every Gasket, Grease Retainer and Allied Products used on Motor Transportation. Victor Jobbers bring you the right gaskets, quickly, economically and conveniently packaged.

Like Pete—You can banish gasket worries by using the gaskets that for 27 years have been the "Quality Standard of the Industry"—Victor Gaskets.

VICTOR MANUFACTURING & GASKET CO.
P. O. Box 1333—5750 Roosevelt Road,
Chicago, U. S. A.

VICTOR!

THE WORLD'S LARGEST GASKET MANUFACTURER

VICTORITE PACKING - GREASE RETAINERS - VICTOR SEAL-AIDE - VIGASCO CEMENT - METALBAC GASKETS - ARMSTRONG - VICTOR PRODUCTS

Springtime is Tune-Up Time

(Continued from page 18)

but also in selling the car owners on having the work done at your particular service station. For instance, cooling systems can be cleaned to a degree by the familiar "boiling out" method. However, special flushing equipment will not only do a better job but will assist in selling the car owner on having the job done.

As another example, there are many mechanics who claim that they can shoot trouble as well as a \$1,500

engine tester. That's a big claim and even if it were true, one thing is sure, the car owner will prefer having their engines checked on the latest type of equipment and the old type of mechanic trouble shooter is having a tough time paying the rent.

The same thought applies to wheel alignment, brake testing, lubrication, electrical work, head light focusing and other repairs and adjustments.

When it comes to cleaning the cooling system, the old procedure was to open the drain cocks and stick a hose in the filler pipe and turn on the water. No charge could be made for such a simple operation. Modern

equipment makes it possible to place a definite charge and does a complete job. In addition, hose connections should be checked and replaced when necessary, fan belts should be renewed or adjusted. Side cover plates should be removed, rust accumulations removed and new gaskets installed. New pump packing should also be installed, and at the same time, pump shafts should be checked for wear.

When tuning the engine particular attention should be paid to the compression of each cylinder, as the compression readings are an indication of the condition of the valves, pistons, piston rings and cylinder walls. If the readings are up to standard, the customer should be told that engine is in good condition, if the compression is low, the need of a carbon and valve job, a ring job, or what ever may be required should be pointed out to the owner and the advisability of having all the work done at that time can be used as an additional selling point.

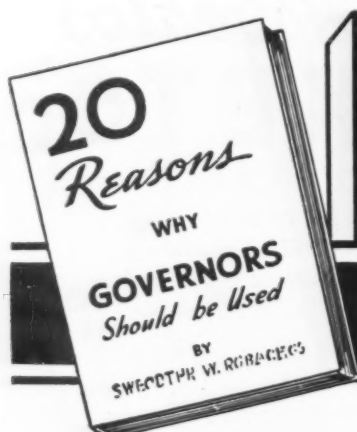
The tune-up operations are among the most important of the entire group and upon which a service station can build a reputation—good or bad—depending on how well it does the work. Careful and accurate adjustments are directly reflected in performance and economy which are quickly noticed by the car owner. A good job will bring him back again, a poor job will send him to a competing service station.

Any one of the jobs listed in the spring selling campaign can be used as a "leader" to bring the customer to the shop. However, the lubrication job is one of the best. While the car is in for lubrication, an excellent opportunity is afforded to check the entire vehicle and also sell the car owner on any additional work.

Resetting the generator charging rate and checking the entire electrical system is also important. And in fact it forms part of the tune-up operation as it includes the battery and battery cables. Without good battery connections no engine will operate satisfactorily.

Brake adjustment and relining jobs are, of course, always important and form a big part of any spring tune-up business. In this connection, many mechanics are making it their practice to always remove a front wheel before attempting to adjust. While it takes a little extra time, it often leads to a reline job, which otherwise would be missed.

Rough winter roads have taken their toll in the form of misaligned wheels. Each service station should make a point of at least looking at the front tires of all cars that drive into the shop. Any unusual wear is generally the result of some form of misalignment. In addition to checking caster camber and toe-in, when a car shimmies, be sure to check for wheel unbalance, front springs and shock absorbers.



FREE!

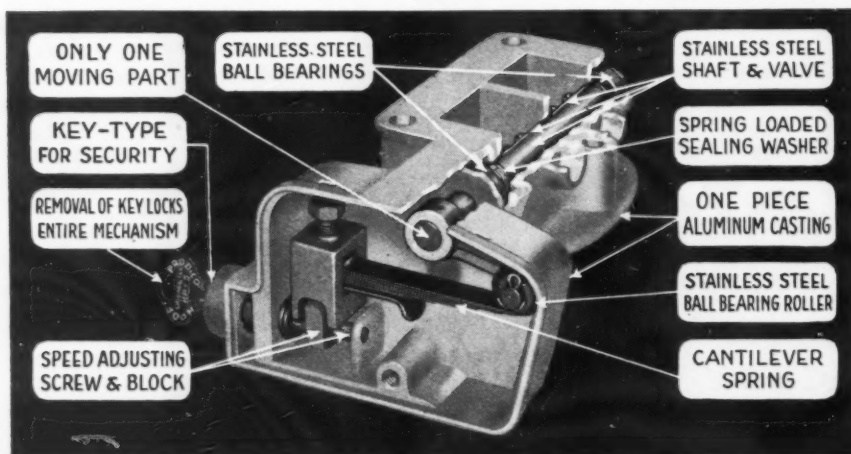
SEND FOR YOUR COPY TODAY

Here are the factual findings and recommendations of one of the nation's foremost authorities upon public highway safety. It is based upon an exhaustive survey made over a period of years. It tells you the cause and prevention of automotive accidents. It tells you how to secure substantial savings in maintenance, operation, gas and oil; how to make auto, truck and fleet drivers more efficient. It is packed full of facts . . . a gold mine of invaluable information for every person driving, operating or servicing a car, truck or fleet. The booklet is free. . . . Write for your copy now.

• Save with Safety . . . with Hoof Governors

HOOF PRODUCTS COMPANY

162 North Franklin Street, Chicago, Illinois



INDEPENDENT GARAGEMEN!

CASH-IN **ON THIS MONEY-MAKING** **CHEVROLET OFFER**

**FOR AN AMAZINGLY
LOW PRICE**

you can get this big

DISPLAY TYPE

PARTS BIN....

stocked with

450

FAST MOVING

Genuine Chevrolet

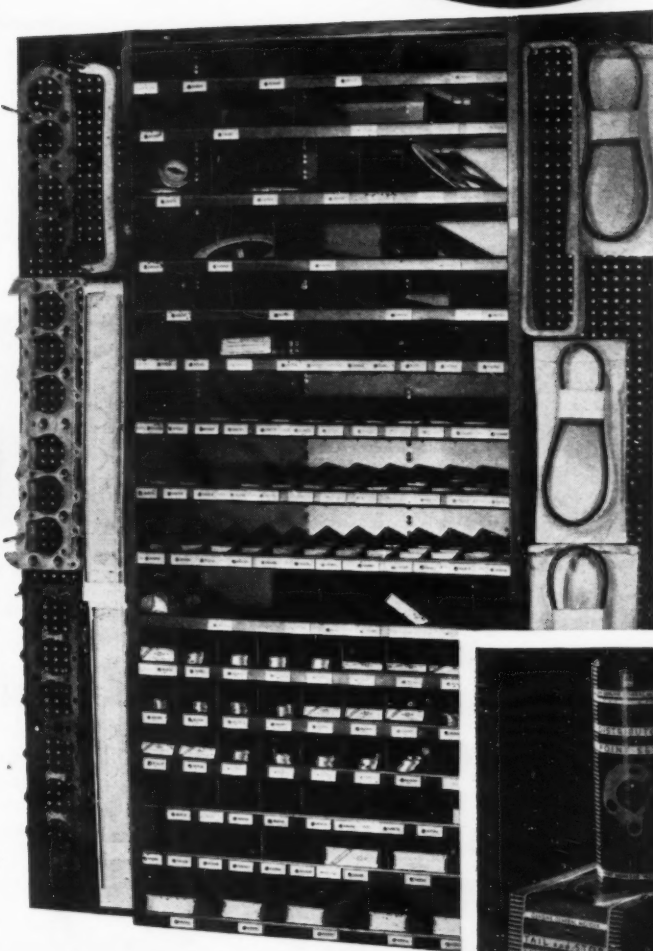
PARTS

Send in the coupon at the bottom of this page! It will bring you full details of Chevrolet's new Genuine Chevrolet Parts Plan for Independent Garage Owners—the most attractive parts proposition in the industry today. Thousands of progressive independent garagemen have already adopted this plan. They are cashing in on one of the most profitable money-making investments they have ever made. Act at once. Get the facts on this remarkably liberal offer.

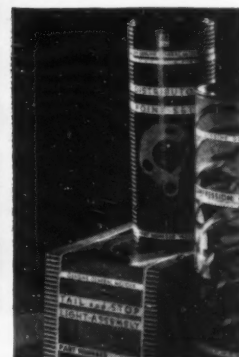
CHEVROLET MOTOR COMPANY, DETROIT, MICH.

For Complete Details
MAIL THIS COUPON TODAY

STOP *at this* **PAGE**



The display-type parts bin shown above is only a part of the Chevrolet plan that will bring you a big increase in service volume and profit. It has compartments and display space for 239 different kinds of parts, and comes to you stocked with 450 fast-moving genuine Chevrolet parts.



Another business builder! Genuine GM packaged parts for Chevrolet protect the contents from moisture, rust, dirt and deterioration. Display of these neat containers creates customer confidence.

CHEVROLET MOTOR COMPANY
Parts Merchandising Dept. B-4
General Motors Building, Detroit, Michigan

Gentlemen:

Please supply me at once, without obligation, the complete details of the new Genuine Chevrolet Parts Plan for Independent Garages.

Name _____

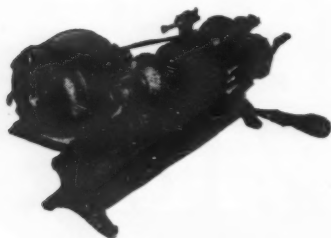
Street Address _____

City _____

State _____

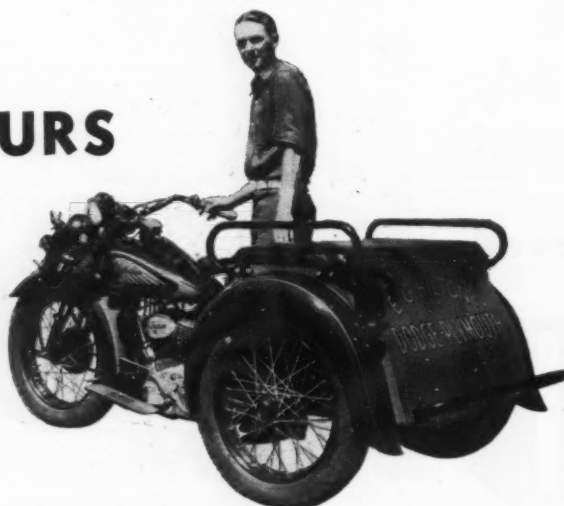
Wood Distributes Trucut Commutator Refinisher

The Trucut commutator refinisher is designed for machining and under-



cutting automotive starter and generator commutators. With this machine, centering the ends of the armature shaft is unnecessary, as the head and tailstock chucks allow the armature to turn on its own bearings exactly as when mounted in the case. A 1/6-hp. motor having a speed of 1725 r.p.m. drives the armature through a belt around the core. The undercutter, which is driven by the same motor, travels laterally by means of a long hand lever. A vertical adjusting screw regulates the depth of the cut. This machine is distributed by Frank N. Wood Co., 316 Caswell Block, Milwaukee, Wis.

Turn IDLE HOURS into *Profit*



One of the most serious economic problems with every Service Station and Garage today is "How to prevent the waste of many Idle Hours." One man with an Indian Dispatch-Tow can quickly convert time, now wasted, into extra business and extra profits.

SPEED AND SERVICE

Car owners today depend more than ever upon service stations and garages, because they want quick and efficient service. Not only does an Indian Dispatch-Tow impress your customers, but it permits quick, economical servicing—and what is more important, saves you money by making it

possible for *one man*, instead of two, to do the job.

EXTRA PROFIT

This economical, new Service Equipment will open new fields for you . . . more profits . . . with less waste of time and money and put you one jump ahead of your competitor.

Indian

INDIAN MOTORCYCLE COMPANY
Dept. M Springfield, Mass.

LET US TELL YOU HOW

INDIAN MOTORCYCLE COMPANY, Dept. M, Springfield, Mass.

Gentlemen:

Please let me know more about the Indian Dispatch-Tow equipment—and How to make my "Idle Hours" pay.

☐ Send Literature

☐ Have representative call

Firm

Street

City—State

Prize Winner Buys Flat Rate Manual



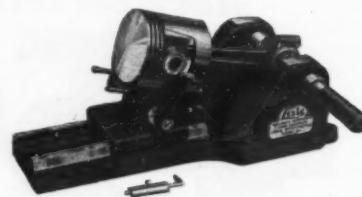
Dewey Morrison, who runs Morrison's Garage, at Longview, Tex., was a prize winner in one of the Motor Age

Money-Of-The-Month Contests.

He got his check a month ago. When he received the money, he sat down, endorsed the check, added another buck to it, and returned the check and money to us. His reason: He wanted the 10th Edition of the Chilton Flat Rate Manual. There's an idea for you; and another good reason why you should take part in future Motor Age Prize Contests.

New Lisle Aligner Checks Rods For Twist and Bend

Connecting rods can now be aligned and straightened in less than two minutes according to the Lisle Corporation, Clarinda, Iowa. All rods up

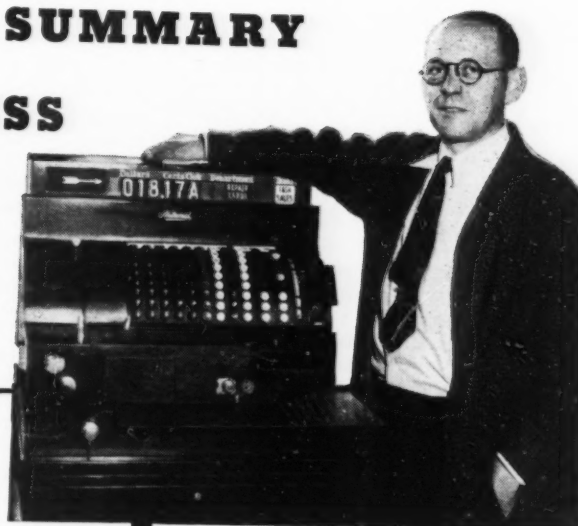


to 15 inches long can be handled by the new Lisle aligner, the cradle moving backward and forward on ways, and adjustable to any length rod. Twist and bend can both be checked from one setting, without removing the piston assembly, and without removing the rod from the aligner. Any inaccuracy in the rod, even to one one-thousandth of an inch, is said to be instantly registered on the gage.

Gets Rid of Dirt and Grease

Cottontex is claimed to be a real oil and grease absorbent for garages, service stations, machine shops, etc. A handful taken from the container and sprinkled over the floor and then brushed up with a stiff broom will remove all trace of oil. Cottontex may also be used to clean grease from the hands, with a dry wash, doing away with the necessity for rags. After this material is used in this way, the manufacturer claims it can still be used for general floor sweeping and will do a good cleaning job. Cottontex can be used wherever sawdust is now being used for absorbing oil or battery acid. This material comes in a 25-lb. carton for \$2.25 or in a 50-lb. carton for \$4.00. It is sold by Cottontex Products Co., 1715 West Canal St., Milwaukee, Wis.

THEY GET A COMPLETE SUMMARY OF THEIR DAY'S BUSINESS BY DEPARTMENTS AND TRANSACTIONS



COCHRAN & NICHOLS

O. K. Garage and Service Station
PHONE ONTARIO 197
114 EAST A STREET
ONTARIO, CALIFORNIA

The National Cash Register Co.,
Dayton, Ohio.

Gentlemen:

We have been using one of your cash registers for over a year and wish to take this opportunity to state that we are very pleased with our system.

One of the unusual features of this system is that we are enabled to know the amount of work in process in the shop, each day, by referring to the cash register. This is in addition to a complete summary of our day's business, by departments and transactions.

Not only does the machine save a great deal of time and give us accuracy never before possible, but with this setup we are enabled to establish a control over our department sales and all other transactions that otherwise would entail so much work that it would be impractical.

We would be very glad to recommend this system to any automotive dealer.

Yours very truly,

Cochran & Nichols.

R.C. Nichols



IMMEDIATELY at the close of each day, through the use of a modern National Cash Register, Cochran & Nichols O. K. Garage and Service Station, at Ontario, California, secure a complete summary of the day's activities by departments and kinds of transactions.

Totals provided by their register give them complete information on different sources of revenue, outstanding charges and money paid out. "Shop In" and "Shop Out" totals give the management a continuous inventory of work in process.

You, too, can get a complete summary of your day's business—quickly, easily and without any detail work—by using a National Cash Register System. See our representative, who will be glad to show you how. You'll be under no obligation.

The National Cash Register Co.
DAYTON, OHIO

Cash Registers • Typewriting-Bookkeeping Machines • Posting Machines
• Bank-Bookkeeping Machines • Check-Writing and Signing Machines •
Analysis Machines • Postage Meter Machines • Correct Posture Chairs

L-P Motor Analyzer

Tests Engine Efficiency

The L-P motor analyzer recently introduced by the Lantz-Phelps Corp., Dayton, Ohio, is said to combine units, for testing the mechanical condition of the motor and for making an exhaust gas analysis. The vacuum gage reveals such defects as a cracked manifold, leaky gaskets, faulty timing, poor ignition setting, etc., while the exhaust analyzer shows the air fuel ratio, actual fuel loss and the completeness of combustion. This instrument operates from a six-volt

battery, and the Wheatstone Bridge structure is protected against condensation and deposits from the exhaust gas. By turning the control switch to the No. 3 position the sensitivity of the galvanometer is greatly increased so that very fine carburetor adjustments are instantly recorded. This motor analyzer sells for \$185.

If desired, the exhaust gas analyzer may be bought as a separate unit. The galvanometer records in terms of lean, normal or rich, so that the car owner can readily see for himself whether his engine is operating economically. This unit sells for \$125.

McQuaide, Sales Chief For Publicker Alcohol

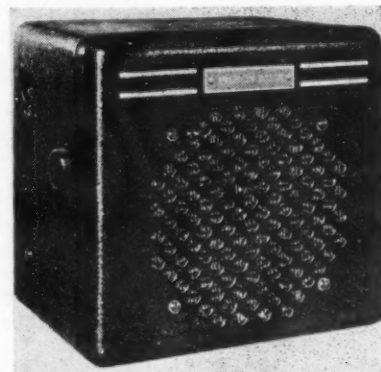


C. G. McQuaide, longtime resident of Chicago, has been appointed vice-president and general manager of sales of the Publicker Commercial Alcohol Co. He will be located at executive offices of

the company, at Philadelphia. Mr. McQuaide is well known in the hardware, drug, automotive and industrial fields. He is a member of the Chicago Drug and Chemical Assn., the Union League, and Illinois Athletic Club. Active in the betterment of trade conditions... member of the Legislative Committee of the Illinois Chamber of Commerce... member of the Chicago Assn. of Commerce... one of the three men to secure the introduction of the Fair Trade Practice Act into the Illinois Legislature... active until its passage as a law... functioning as treasurer of the Fair Trade Practice Association of Illinois... one of the first to bring suit under the act and secure permanent injunction.

Six New Skylark Radios By American-Bosch

The new line of Skylark American-Bosch auto radios consists of six models ranging in price from \$39.95



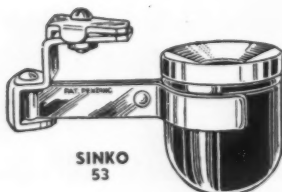
to \$67.95. High standards of tone purity and great sensitivity are said to be assured by these new designs. Both glass and metal tube sets are offered and header, bulkhead or built-in speakers can be supplied. A steering post or panel control mounting is provided to match practically every make of car. The United American-Bosch Corporation is located at Springfield, Mass.

Govern The Other Fellow

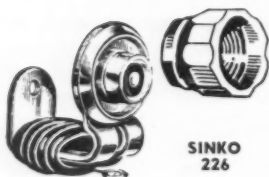
The public is demanding speed governors for automobiles. They are demanding them for others, however, and not for themselves, according to Arthur A. Bull, member of the Society of Automotive Engineers and president of the Handy Governor Corp. of Detroit.



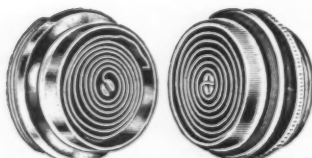
SINKO
625



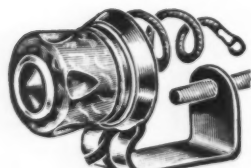
SINKO
53



SINKO
226



SINKO 549 SINKO-501



SINKO
606

Don't miss a good bet! These new Sinko items are SALES WINNERS!

You'll find that most of the lighters and ash trays are SINKO. We specialize in these products and put real stuff in them. That goes for the ornamental gear shift balls too. No. 626 is a wireless cigar lighter with a window which shows when lighter is hot enough. Replaceable Nichrome element. Strikingly finished in silver-gray, vivid red, cream white, walnut and black. List price \$1.00 each. Attractive individual boxes.

Sinko No. 53 Invisible-clamp ash receiver fits all late cars. Swings out of the way when not in use. Beautifully finished in chrome and two-color crackle. Standard package of twelve, individually boxed. List 35 cents each. Sinko No. 226 Lighter sells for only 75 cents, but it is a quality article in every respect. Nichrome element. Polished chrome with choice of Morocco red, lime green, or natural onyx. One of our best sellers!

Sinko Replacements, Nos. 501 and 549, fit all Cartridge type standard equipment lighters. Genuine Nichrome elements. Positive contacts. Sell from the colorful cards shown below.

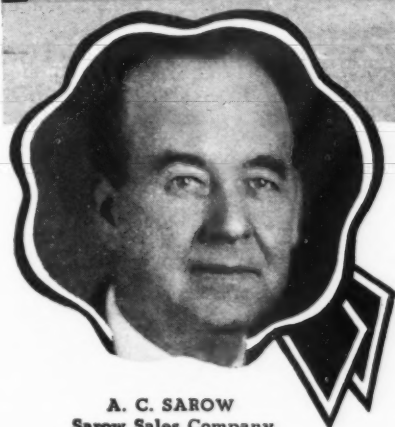
Sinko No. 606 lighter is a deluxe job for finicky customers who must have something better. Beautiful color combinations in French beige, natural onyx, and Brazilian onyx. Entire unit glows when hot. List price \$1.50.

Get our catalog of real values. It means money in your pocket.

SINKO TOOL & MFG. CO.
351-371 N. Crawford Ave., Chicago, Ill.

THESE DISPLAY
CARDS AND
CARTONS
HELP
YOU SELL!





A. C. SAROW
Sarow Sales Company

"I've made more money with Chrysler"

"**B**EFORE I signed up with Chrysler I investigated several franchises with great care. I chose Chrysler because of the complete coverage afforded by the Chrysler and Plymouth lines, and the rapid and steady progress of the Chrysler Corporation. I became a Chrysler dealer in February 1933, and despite the fact that my experience dates back into some of the dull period, I have had a profit every month with very few exceptions. Happier with Chrysler? I certainly am!"

A. C. Sarow
Saginaw, Mich.



Good dealers make good money with Chrysler in every part of the country. Naturally, Chrysler dealerships are in demand. Inquiries on file receive preference when territories are available. Address Chrysler Corporation, Chrysler Sales Division, Detroit, Michigan.

CHRYSLER *and* PLYMOUTH

Sun Oil Taxes Larger Than Profit in 14-Year Period

An interesting survey of oil taxation accompanied the annual report of the Sun Oil Co., made public last month by J. Howard Pew, president of the company. During the past 14 years, the survey stated, the Sun Oil Co. has collected and paid to public treasuries \$118,013,531 in taxes while net income for the same period totaled \$63,788,744.

For 1935 the company's net income was \$7,100,238 compared with \$6,650,464 in the previous year.

Three New Maintenance Tools Added To Thor Line

The Independent Pneumatic Tool Co., Chicago, Ill., announces a new portable electric sander and a new polisher. The Thor sander is designed for sanding, cleaning and preparing automobile bodies for paint. This tool has a free speed of 3100 r.p.m. Features of the electric polisher are said to be its light weight, balance and ease of handling. Both the armature and the spindle run in ball bearings to give maximum torque to the wheel.

The tool weighs 7½ lb. and has a free speed of 1950 r.p.m. Both the sander and polisher are designed for easy inspection and cleaning.

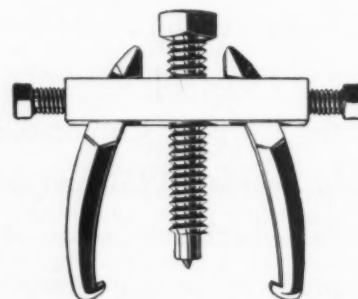
Another addition to the line of



Thor tools is the electric heat gun, for thawing out frozen radiators and water pumps, and warming up stiff lubricant in the crankcase, transmission or differential. Air is forced through the gun at a high velocity and leaves the nozzle at a temperature of 400 deg. This tool is said to be constructed so that grease, oil and dirt cannot affect its operation. A long and short goose neck, wide nozzle and a flexible hose are provided to reach inaccessible places.

National Machine Makes New Junior Gear Puller

The National Junior puller has an improved design which permits reversing the fingers, making it possible to pull gears or bearings from either the inside or outside. A feature of



this puller is the provision for locking the fingers when in place to secure a positive grip on the work. This tool will handle gears with an outside diameter up to 3 in. Made of drop-forged, heat-treated stock, it retails for \$1.50. It is a product of the National Machine & Tool Co., Jackson, Mich.

Well, have
YOU
tried it
yet?



**A & C Coil Tester
Is Making a Hit
With The Boys
Everywhere!**

"IT SELLS COILS"

**A & C
Pocket
COIL
TESTER**

**\$1²⁵
LIST**

**"IT
SELLS
COILS"**

NO ONE will run his car with a weak or bad coil—if he knows it is bad. But how are you going to tell him he needs a new coil unless you test it? ? ? The most complicated test in the world can show only three things—whether coil is good, poor or bad! The new A & C TESTER does just exactly that—QUICKLY—in full sight of the customer—without removing coil from car—without adding wires—with engine running and under compression. A most convincing visual demonstration of the actual ignition efficiency of the coil under test. It is scientifically sound—not to be confused with "cure-all" gadgets. Vest pocket size. Use one yourself, and sell them to customers who like to make their own tests.

See your jobber—or order direct. Get yours now.

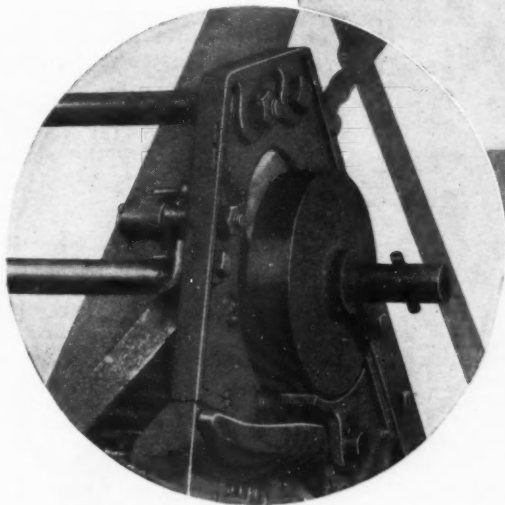
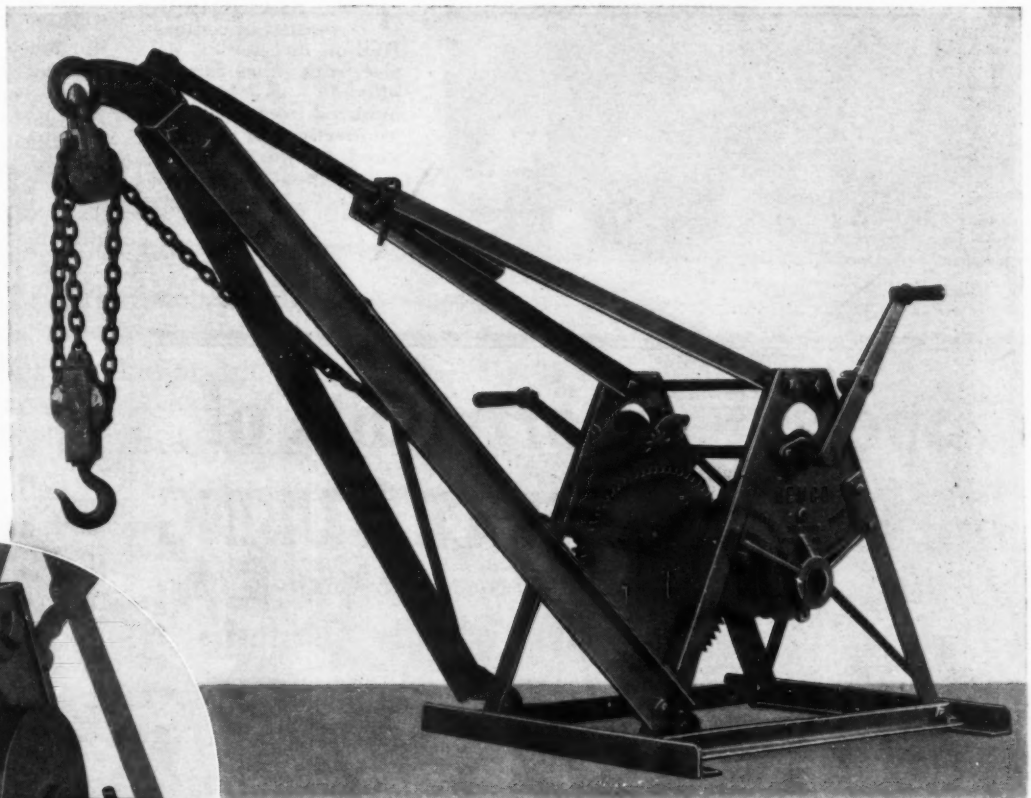
**A. & C. Manufacturing Company
1613 N. 18th Street Philadelphia, Pa.**

NEW TIMES · · *New Equipment*



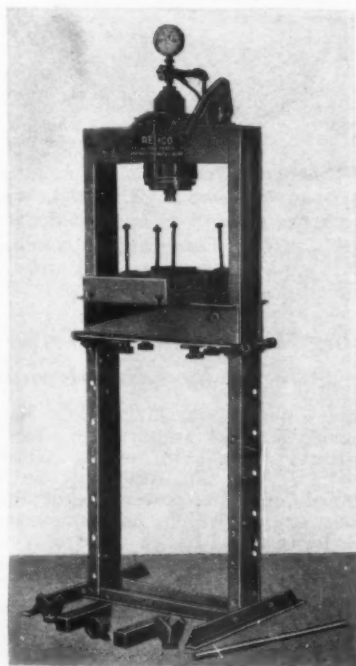
"Find out what modest money it now takes to purchase really fine shop equipment." R. E. Manley.

• • • • •
3 Ton Wrecking Crane. The only crane with lowering brake. One man adjustment. Two speed handle. Load carried on 3 chains, instead of the conventional 2. Pawl holds load so it can't bounce off. Swivel head. Ground operation device optional.



Meeting the need of the times for simply designed shop equipment at a lower price. Bringing economy without cheapness. Bringing every new invention for added strength, power, speed, safety, without high price. All this you will find in the Remco line. A line which inherits all that Bob Manley has learned through 20 years experience in designing, and building, shop equipment. Write for prices and details. Manley Products Corporation, State & Hay Sts., York, Penna.

20 Ton Hydraulic Press. Handles all passenger car, and light truck, work. Solid cast head—frame, cylinder and oil box cast as one. Table pins heat treated chromium nickel steel. Manley's new invention of an adjustable table optional.



REMCO

SHOP EQUIPMENT

Hydraulic Presses, Wrecking Crane,
Car Washers, Jacks, Trussels, etc.



Hudson Service Executives Plan Meetings



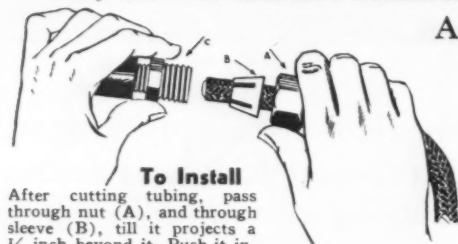
T. H. STAMBAUGH,
(seated in center)
Hudson director of service, with other factory officials, as he announced over 750 service meetings to be sponsored by the company throughout the U. S.

Special Assortments of IMPERIAL FLEXIBLE TUBING

For Replacements of Gas, Oil, Grease and Vacuum Lines

In "Make-Up" and "Ready-Made" Lengths

REPLACEMENTS of flexible lines are handled far more easily and quickly by using either of the assortments shown below. You can make installations from stock coils, in any length or in special lengths "ready-made" for immediate installation on passenger cars.



To Install
After cutting tubing, pass through nut (A), and through sleeve (B), till it projects a 1/2 inch beyond it. Push it into body (C), and tighten nut.

Assembling "Make-Up" Lines Right from the Coil

Replacements straight from the coil are made by means of special couplings. The desired length is cut off, and the special couplings (they are made for every type of assembly) is attached as shown on the left.

Assortment for "Make-Up" Assemblies

The steel cabinet shown on the right holds all the couplings in commonest use arranged at the top. Shelves below hold boxes containing three 12 1/2 ft. coils of tubing in 1/4", 5/16" and 3/8" sizes. The entire outfit is very compact, and takes care of most of your line replacements.

Assortment of "Ready-Made" Tubing in Standard Lengths

The assortment illustrated below on the left consists of a selection of the correct lengths for replacements on the more popular cars on which flexible tubing is standard. They are ready-made with couplings, for



immediate installation. From this selection you can offer a better line than is found on most cars.

Imperial flexible tubing is gas, oil, vacuum, heat and cold proof. Made with a brass core fused to a compound covering, with oil-proof fabric outside, yet absolutely flexible.

Order from your jobber. Write also for pages 19 and 20 of automotive catalog 113.

IMPERIAL BRASS MFG. CO.
1217 West Harrison Street CHICAGO

Improved Sleetex Blade Perfected for Winter '36

The Sleetex Co., Inc., of New York, manufacturers of the Automatic Sleetex Windshield Defroster Blade announce an improvement in their product following months of research by one of America's foremost scientific laboratories.

Without reducing its ability to instantly remove sleet, snow and ice from the windshield, the improved blade will provide much longer service life to the motorist.

The Sleetex Defroster Blade is quickly and instantly attached to the windshield wiper arm, having a universal hook to fit every make of car. The wiper arm operates the Sleetex Defroster Blade identically the same as the customary rubber wiper and, like magic, snow and sleet vanish from the windshield. The Sleetex Blade provides a large arc of vision and continuous action. Its smooth cushion filled with a patented ice-dissolving substance, is backed by a blade of non-corrosive and non-rusting metal. It will not scratch, crack or discolor the windshield.

Sleetex is effectively displayed on an attractive and colorful counter card which holds 12 of the actual blades.

Measures Starter Current

The Burton-Rogers Co., 755 Boylston St., Boston, Mass., is marketing the Hoyt starter current indicator, which sells for \$2. This meter is



simply hooked over the starter cable, and, when the switch is closed, will indicate the amount of current drawn by the starter. There are no connections to make or leads to hook up.

Spring Merchandising Helps Offered by Globe-Union

The Globe-Union Mfg. Co., Milwaukee, Wis., has prepared two merchandisers to aid in selling Globe batteries. The No. 720 unit is a combined "spinning power" tester and display stand which accommodates eight batteries. Large moving coil meters are used, the voltmeter being clearly marked "Weak-Fair-Good" so that the owner can readily see the exact condition of his battery. A smaller unit known as the No. 730 is designed for wall mounting.

OPEN for BUSINESS

BRING ON THE WORK! No job too tough for this Blackhawk Treasure Chest. Seventy sturdy, dependable, speedy tools in a strong, compact easy-to-get-at case. Booming days to come will mean promotions in service shops. Mechanics who own Treasure Chest, Big Chief or other Blackhawk Sets stand first in line for better and bigger jobs. You'll "go places" with these complete sets of perfectly matched tools — with that exclusive Blackhawk feature — "LOCK-ON." It clicks combinations of handles, extensions and sockets into one solid tool. Great for close work. No lost sockets — no lost tempers — no lost time. Assures "smooth sailing" all through the toughest day's work.

Ask your jobber salesman —
and Mail Coupon Pronto!
"Next time Buy Blackhawk"

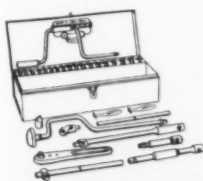
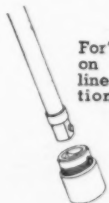
BLACKHAWK MFG. CO.
Dept. MA-4 Milwaukee, Wis.

Sole Canadian Distributor:
The Canadian
Fairbanks-Morse Co., Limited
Branches in all Principal Cities

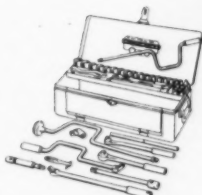
The line with
the Famous
"LOCK-ON"
Feature

"LOCK-ON"

For "LOCK-ON" — slip socket on square drive, hole in line with plunger. For friction-grip, do not line up hole and plunger.



No. 30 CD Set
— most popular for general auto work — 30 fine units in all-standard 1/2" square "Lock-On" drive.



No. 45 CB Set
Junior Treasure Chest — priced so low that every mechanic can afford to own one.



No. 70 RD Treasure Chest

70 superb, matched tools — speedy, rugged, efficient — for mechanics who want to get ahead.

BLACKHAWK MFG. COMPANY

Dept. MA-4
Milwaukee, Wisconsin

Shoot me the "Mechanics Handy Guide" and the One Minute Movie — "Saving Time with LOCK-ON."

BLACKHAWK Socket Wrenches

Name
Address
City and State

Wanted: An Army of Paul Reveres

(Continued from page 25)

if we all did believe that Mr. Roosevelt is everything that Jim Farley, Rex Tugwell and some of the other boys would have us think he is, we wouldn't want laws like that because Mr. Roosevelt can't be President forever. The next President might be even more of a centralized government, control-everything man than he is. And if that man had a Congress that was willing to do anything that he, as

President, wanted it to do, we might also have a Supreme Court made up of Brain Trusters or Parlor Reds, and then where would we be?

Our farmers would go to jail if they planted too many potatoes or didn't kill enough baby pigs, and our business men, including independent service station owners, couldn't buy anything or sell anything or do any job unless some nosey, autocratic bureaucrats told them it was all right to do it.



When Mr. Roosevelt was Governor of New York State he made one of the finest speeches ever made in favor of States Rights and against the extension of powers of the national government. Every American ought to read it. We would advise Mr. Roosevelt to read it except that sometimes when you know the fellow who writes what you read you haven't so much confidence in what he says. We would want him to believe that the fellow who wrote that speech meant what he said and knew what he was talking about.

There is hardly an important move that the present administration has made in the way of regulating this or controlling that which Communists would not have made if they had been voted into power in 1932. It is what is being done more than what is being said that makes us think it is time to call a halt. If it were not for our Constitution and our Supreme Court we would be much nearer the Authoritarian State than, happily, we are today. We remember that there was a time, before the Supreme Court went into action, when Mr. Roosevelt wrote a letter telling one of his chief helpers in Congress not to worry too much about the constitutionality of a bill that was up for passage. Of course, he may have meant something different from what he seemed to mean.

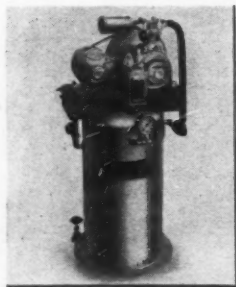
Before the New Dealers started to try to make this country over there wasn't anything the matter with it that wasn't and hasn't always been the matter with any and every country that is or ever was. That trouble lies deep in the people themselves. It is the weakness of human nature. Greed and selfishness, indifference to the welfare of others are not the results of any form of government, political or economic. Certainly not of American Democracy and the American System of Enterprise.

So long as human nature is what it is there cannot possibly be any such thing as true Communism or true Socialism anywhere in the world. You can say that either of them is desirable, as an ideal, if you want to. The only way that any country can have a planned economy today is through absolute dictatorship of a pitiless, ruthless, stern and unscrupulous character. People are what they are and a change in the form of government won't make them different.

We have made more progress in 150 years toward better living for everybody, greater individual freedom and opportunity than any other people anywhere on the face of the globe. Why should we let anyone try to change things? There are some who

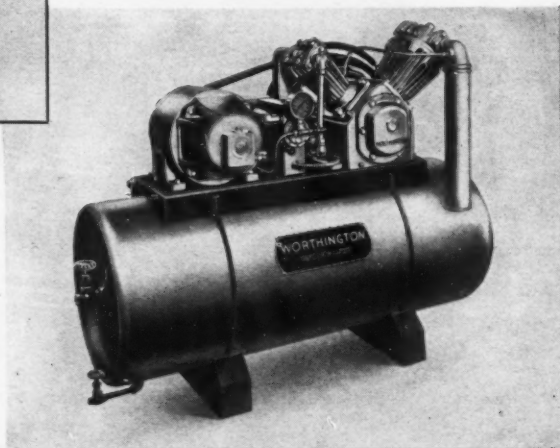
(Continued on page 100)

YOUR STATION AIR EQUIPMENT



KEEP
IT
ON THE
JOB
with a

*is only as dependable
as the compressor
behind it . . .*



WORTHINGTON COMPRESSOR

EVERY detail thoroughly engineered . . . accurately built . . . by an organization with 40 years of experience in meeting the most exacting air compressor requirements in every field.

• Sold through leading jobbers

WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: HARRISON, NEW JERSEY

A-38291

Offices and Representatives in Principal Cities throughout the World

WORTHINGTON



VALUABLE GUIDE FREE!



COMPLETE MOTOR RECONDITIONING DATA FOR OVER 500 PASSENGER CAR MODELS INSTANTLY AVAILABLE ON THESE 5 GIANT CARDS—SAVES TIME—SAVES WORRY HELPS YOU SOLVE ANY MOTOR PROBLEM!

ALL INFORMATION FOR EACH MAKE AND MODEL IS CONTAINED ON ONE CARD WHICH CAN BE HUNG RIGHT BY THE JOB!



Pedrick's

7-11 ALL STEEL SHOP CABINET
and complete motor reconditioning guide

Don't waste time hunting for information regarding clearances, measurements, timing or ignition data, etc.! Pedrick has found a way to help make your job easier. All the information you need for a motor overhaul is contained on one card—and, it takes only five of these cards (using both sides) to tell the whole story on practically every model built during the last seven years.

ASK YOUR JOBBER FOR FULL DETAILS!

Your Pedrick Jobber will show you this valuable guide and he'll also show you the beautiful, all-steel cabinet that is another important gift to progressive repairmen. Remember the Guide and the Cabinet are both free! See your Pedrick Jobber immediately!



CONVENIENT POCKET ON INSIDE OF DOOR HOLDS THE RECONDITIONING GUIDE

The five giant cards are kept handy for quick and easy reference in this, convenient pocket. The card you're using can be removed and taken right to the job and, when through, returned to the pocket for safe keeping.

See next page for greatest
PISTON RING VALUE EVER OFFERED

HERE'S THE TRUTH!

NO OTHER PISTON RING COMBINATION CAN BEGIN TO EQUAL THE PERFORMANCE OF . . .

Pedrick

HEAT-SHAPED

HYDRAULIC PISTON RINGS

OUR CLAIMS ARE BACKED BY FACTS!

You don't have to imagine anything to convince yourself that Hydraulics are "The Finest Rings Ever Built—Regardless of Price." Tests of every description—conducted by leading automotive

engineers and thousands of personal testimonials from repairmen the country over—testify positively to every claim we make for this sensational and revolutionary principle of piston ring design.

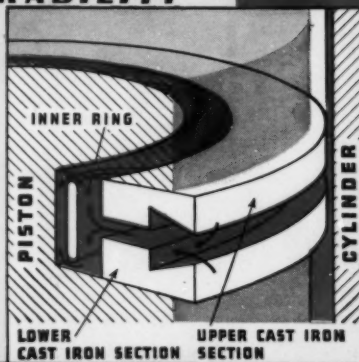


THE ONLY RING THAT GIVES COMPLETE POWER CONTROL!

Try to find another ring that stops blow-by like Hydraulics do and you will realize why they are so far ahead in performance records. Oil control is only half the job, and if you get it at the expense of blow-by, you are losing power—making the motor sluggish and wasting gasoline. With Pedrick Hydraulics you get Complete Power Control—both Oil Loss stopped and Blow-By checked! And, remember this—the Pedrick Hydraulic, with its exclusive and patented design, is the only ring that can deliver such outstanding efficiency!

A SEAL THAT HAS EVERYTHING TIGHTNESS ★ FLEXIBILITY ★ DURABILITY

In the illustration to the right you will see how the Hydraulic principle functions to assure complete power control. Hydraulic pressure is built up between and back of the ring sections. The black arrows in the illustration show the direction and action of the oil (indicated in red) which is scraped from the cylinder by and through the ring sections. The pressure between the sections holds them firmly against the sides of the groove while the oil behind them keeps the face of the ring at the wall. Thus, by means of Hydraulic Action, a tight liquid seal is provided, which is sufficiently flexible to follow a worn cylinder, and blow-by is prevented with an absolute minimum of friction.



ONLY HYDRAULICS

can do ALL of these things . . . and do them even in badly worn engines

- | | |
|------------------|--------------------------|
| 1 STOP OIL WASTE | 4 SAVE GASOLINE |
| 2 INCREASE SPEED | 5 IMPROVE PICK-UP |
| 3 STEP UP POWER | 6 ASSURE LASTING RESULTS |

COMPRESSION
TYPE

OIL-CONTROL
TYPE

Patented in United States
and Canada

Wilkening Manufacturing Co.

Export Department:
Overseas Motor Service Corp., New York

Philadelphia

In Canada:
Wilkening Manufacturing Co. (Canada) Ltd., Toronto



Let's talk **ABOUT THE FENDER BUSINESS**

Unless you provide replacement Fender service your service is not complete—but what is more important, you are passing up one of the biggest opportunities in the automotive maintenance field for profits.

Every time you sell a pair of Fenders you handle real money and your profit is a double profit, averaging \$4.00 on the Fenders and \$4.00 on the work. In no other service activity are there similar possibilities.

Fender service does not require any expensive testing or installation equipment. Neither does it require any big stock investment if you will depend on your Automotive Wholesaler for your stock requirements.

Today, your wholesaler is the only source of supply for Fenders for more than one make of car. And he has only one make of Fenders—**FOSTORIA GENUINE FENDERS**, guaranteed to match original specifications in every detail.

Why not stop in to see him and talk over this big business opportunity. Let him show you the figures, show you how he is set up to help you provide Fender service, show you how to go about getting the business.

You will find your Fostoria Wholesaler more interested in the replacement business than ever before, because statistics show that Fenders rank fourth in volume with all replacement parts.

P.S. If you will write me I shall be glad to send you a new 1936 Fender Catalog and a handy Serial Number Wall Poster.

Cordially yours,



Fender Jim

The Fostoria
Pressed Steel Corporation
Fostoria, Ohio

Wanted: An Army Of Paul Reveres

(Continued from page 96)

want to. Rex Tugwell, the college professor, is one of them. "What is needed," said he not long ago, "is a submission to discipline under leadership." That's the way they talk in Russia, in Italy and in Germany. "We have a leader," he added. So have they in Russia, in Italy and in Germany. In the same speech he asked his hearers if their sources of indignation are deep enough so that their "wrath may sustain a genuine reconstruction of American Life."

Indignation at what? At the highest standard of living that the world has ever known? Indignation at a system which gives men like him the right of free speech? His indignation should be saved for the effects of the theories and activities which result in the expenditure of \$500,000,000 a year to reduce our agricultural output while, at the same time, we are laying out \$300,000,000 a year to increase fertility and productivity by irrigation and the development of new farms, and are sending some more hundreds of millions to farmers in foreign lands so that we can have enough food in this country to keep our people alive.

Perhaps he is indignant at the record of business which, under the American System of Enterprise, was able to save for a rainy day and thus pay out during 1931 through 1934, 26 billions and six hundred millions more dollars, mostly to wage earners, than it took in during that period. This is twice as much as the Government in Washington has paid out, in the same period, in money still to be collected from taxpayers. By being able to go down into its pockets and pay out \$26,600,000,000 more than it took in over a trying period of four years, business has kept thousands and thousands of men in work they couldn't have had if business had not built up this backlog of reserve money. Maybe Mr. Tugwell is indignant about that.

We need today more men who are indignant at the things that Mr. Tugwell's indignation leads him to do. We need a whole army of Paul Reveres, riding in automobiles, to travel through every village and hamlet and call those who want to be free and independent to the defense of American Democracy and the American System of Enterprise.

Weatherhead ADVANCES AGAIN!

Announcing EXCLUSIVE DISTRIBUTION of ACCURATE RUTH HYDROMETERS and FREEZEMETERS

Made by Ruth Glass Div., Kimble Glass Co.

COMPLETE LINE AT
THE RIGHT PRICES
Ask Our Representative
or Write

THE WEATHERHEAD COMPANY
620-714 FRANKFORT AVENUE CLEVELAND, OHIO

Alco Automatic Lubricator Feeds Proper Amount of Oil

The Alco automatic lubricator is designed to provide just the proper amount of oil to the steering spindles, spring shackle bolts, clutch yokes, etc., without attention, except for refilling every 10,000 miles. S.A.E. 90 E.P. lubricant is recommended for use with this device. This lubricator, which is installed in place of the conventional grease fitting, contains a weighted plunger which forces the lubricant past a check valve into a high-pressure chamber, from which it is metered by an adjustable metering screw at the rate of 1 to 5 drops every 100 miles the vehicle travels. Since the plunger is actuated by road shocks, no lubricant will be fed when the car or truck is not in motion. An adaptor is provided which makes it possible to install the lubricator in an upright position for any location. This device is a product of the Automatic Lubricator Co., 53 W. Jackson Blvd., Chicago, Ill.

New Tool for Body Work

A new portable tool to expedite the work of the body repair man has been brought out by the James Clark, Jr., Electric Co., Louisville, Ky. It is a



combination sander and polisher, and in order to convert the machine all that is necessary is to exchange the sanding disc for a lamb's wool bonnet, which is included in the equipment. By shifting gears the proper speed is obtained for either operation. The weight of this tool is 10½ lb.

'EVEREADY *Here it is!* PRESTONE'

PRE-SEASON OFFER FOR 1936...

This special, accurate
"Eveready Prestone"
Tester



...AND

a De Luxe Kit
of Selling Helps

ALL FREE!

TO EVERY DEALER who orders 24 gallons, or more, of
"Eveready Prestone" and agrees to take delivery from his
"Eveready Prestone" distributor before October 15, 1936.

- 1 "Eveready Prestone" Cloth Banner
- 2 The "Eveready" Manual of Cooling System Service
- 3 Specification Chart
- 4 Making Extra Profits with "Eveready Prestone"
- 5 Consumer Folders
- 6 Outdoor Tacker Sign
- 7 Ripley Cut-Out Can Display

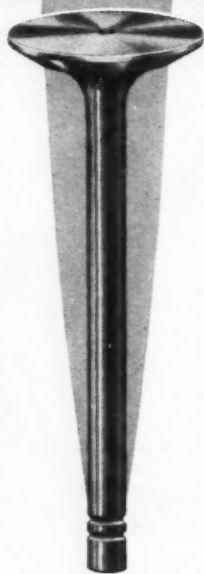


YOU KNOW WHAT HAPPENED IN 1935! WATCH 1936!

"Eveready Prestone" sales are growing in volume steadily. There are now more than 5,000,000 regular users of "Eveready Prestone"—it is the largest selling permanent anti-freeze on the market and the total 1935 volume showed a tremendous increase over 1934. This means that "Eveready Prestone"

dealers reached a new high for anti-freeze profits last winter and "Eveready Prestone" is making new friends and is becoming more profitable to sell each year. Push "Eveready Prestone" this season and make your greatest profit with "The Guaranteed Anti-freeze."

Now
FIRST
with Valves of
SILCROME



Rich, the oldest name in motor valves, again is first with the new!

This time Rich leads the way with valves of Silcrome-X—the outstanding series of valve steels announced in The Saturday Evening Post of March 28.

Rich Silcrome-X valves provide far greater resistance to heat, shock, warpage, corrosion, and erosion. Made from a new series of steels finely graduated in their metallurgical composition, there is a grade to meet exactly the requirements of every 1936 motor. No longer is a single grade of steel satisfactory for all motor valves.

Realizing this, many manufacturers of automobiles, trucks, and airplanes have adopted these new Silcrome-X valves in their 1936 models!

Rich Silcrome-X valves for replacement also are available for these same engines.

Like all Rich valves sold for replacement, Rich Silcrome-X valves conform exactly with original requirement specifications. When you replace with Rich valves, you are using genuine parts—the kind of valves specified by the car manufacturers.

Play safe! Install Rich Valves. They cost no more!



WILCOX-RICH CORP. • DETROIT
 Subsidiary of EATON MANUFACTURING CO.

Rich Valves are sold for Replacement Purposes Exclusively by
 McQUAY-NORRIS MFG. CO., ST. LOUIS and KING QUALITY PRODUCTS CO., ST. LOUIS

RICH *Valves*

"TUNE-UP" FOR PROFIT

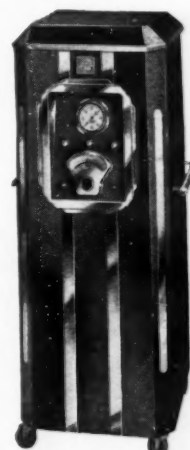
Now is the time to consider the inestimable value of tune-up equipment as you want your share of the business. Build up customer confidence by installing Stromberg Instruments.

When buying instruments or analyzers, always consider the value which you will receive for every dollar invested, as this is the only true basis of comparison. You will find that there is a Stromberg Instrument that will fulfill all of your requirements, as they have always been famous for their value.

EXHAUST ANALYZER

This new analyzer is introduced to provide a dependable method of gas analysis, and for this reason it uses principles that have heretofore been employed only in laboratory practice. These revolutionary principles, upon application to automotive work, show fuel induction efficiency with a degree of precision that is amazing. To obtain the sensitivity and accuracy, we designed and built the large electrical meter. Exemplifying the thoroughness and foresight involved in the development of this new method of correcting fuel induction inefficiency.

Every mechanic knows how valuable an exhaust analyzer is in proving inefficient, wasteful carburetion. Furthermore, customers are impressed by the legible, multi-colored dial reading in percentage, the unburned gases present in the exhaust stream. The impressiveness of this analyzer is also enhanced by its large size and attractive blue finish with chromium trim. It is possible to quickly *remove the instrument unit from the cabinet* to facilitate road tests.



SIZE 52"x20"x20"

MOTOSCOPE C-3 \$175

Here is the complete, moderately priced analyzer that the trade has needed, consequently it is designed for use by any shop, regardless of size. All of the features that make Stromberg Instruments outstanding have been included, resulting in an analyzer that is pleasingly different and accurate.

These features include the mercury vacuum gauge, electrically selected cam angle method of testing coils, and the selector switch system of analysis procedure that simplifies testing to the greatest degree. Every other part of this analyzer likewise increases its value, marking it as a major advancement in tune-up equipment.

Get your shop "tuned-up" at once for bigger profits by installing a Motoscope C-3, as it has everything you have ever wanted in an analyzer. Two other models of the Motoscope C are available at \$125 and \$155.



SIZE 67"x37"x24"

Ask your jobber or write for literature on Stromberg Instruments, including vacuum gauges, compression gauges, fuel pump gauges, mercury vacuum gauges, electrical testers, coil testers, condenser testers, analyzers and hydrometers.

STROMBERG MOTOSCOPE CORP.

2130 LAWRENCE AVE.

CHICAGO, ILL.

Makers of Precision Instruments



KING QUALITY *presents*



THIS COMPLETE LINE OF PISTON RINGS

now gives you the right combination —

1. slip-in
2. expander
3. complete overhaul

for any motor condition.

Super-X

REG. U.S. PAT. OFF.

OIL and COMPRESSION RINGS for the Spring Expander Ring Field

*In Engineered
Combination Sets for
Popular Makes of Cars*

Only Super-X has these Exclusive Performance Features



Patented Interlock.
Ring slightly notched where expander fits into it at this point. Supports ends of ring so as to prevent fluttering, spinning and rotating. Keeps the joint of ring opposite joint of expander.

Seven high-pressure points opposite seven low-pressure sides.

Distributes tension equally around the ring.

Allows expander to accommodate itself to greater range of groove depths.



SUPER-X OIL RINGS



Modified high-unit pressure faces.
Oversize oil slots.



Superoyl scraping and distributing groove.
Scrapes the oil away from the cylinder wall on the down stroke and empties it on the up stroke. Distributes it all around the ring.

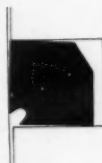


Expander Ports.
Free passage of oil through ports at all times. Expander, full width between high pressure points — doubles resistance to buckling.

SUPER-X COMPRESSION RINGS



Super-X Oil Groove interrupted at the ends.
Traps oil, lubricates ring belt, creates seal between rings and cylinder wall.



Triple sealing action. A bevel section in the inside upper half of the ring causes it to twist in the groove. This "cocked" position gives it three-point sealing action: at the cylinder wall, at top of ring groove, and at bottom of ring groove.



Sturdy 7-point expander.
Made of Swedish Steel. Heat treated twice in Sweden; once here after manufacture. Like the Super-X Oil Ring, it has the patented interlock for greater support.

MADE OF ELECTALLOY

REGISTERED U. S. PATENT OFFICE

FORD

Tailor-Fit matching panel controls available for 1934-35-36 models at no extra cost . . . with Overhead, Separate Case or In-the-Set speakers.

CHEVROLET

Tailor-Fit matching panel controls available for 1935-36 models at no extra cost . . . with Overhead, Separate Case or In-the-Set speakers.

PLYMOUTH

Tailor-Fit matching panel controls available for 1934-35-36 models at no extra cost . . . with Overhead, Separate Case or In-the-Set speakers.

DODGE

Tailor-Fit matching panel controls available for 1935-36 models at no extra cost . . . with Overhead, Separate Case or In-the-Set speakers.

PONTIAC

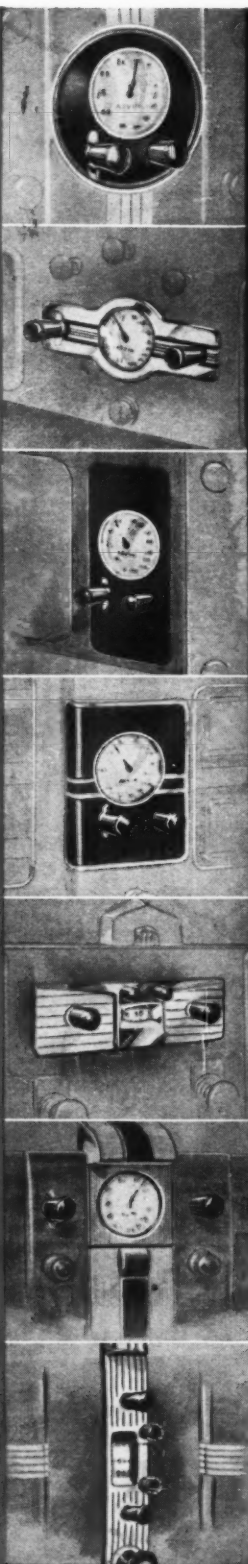
Tailor-Fit matching panel controls available for 1935-36 models at no extra cost . . . with Overhead, Separate Case or In-the-Set speakers.

OLDSMOBILE

Tailor-Fit matching panel controls available for 1935-36 models at no extra cost . . . with Overhead, Separate Case or In-the-Set speakers.

BUICK

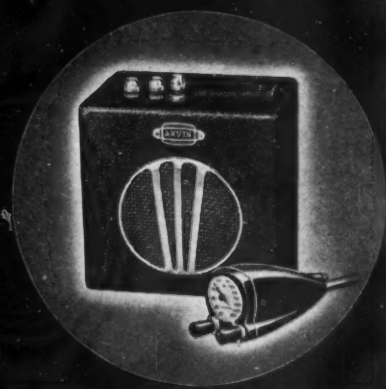
Tailor-Fit matching panel controls available for Buick and other new cars at little or no extra cost.



THE ARVIN PROGRAM IS
Tailored
TO FIT YOU AS
Perfectly
AS YOUR
Easter Suit



ARVIN
Tailor-Fit
CAR RADIOS

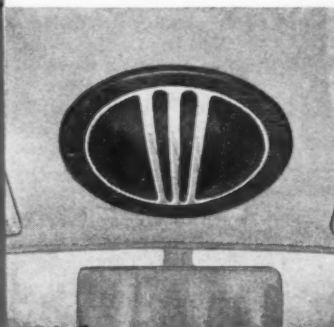


● Your new suit couldn't fit you more perfectly than the Arvin Car Radio program. It's tailored to your desire for sales and profits—tailored to your customer's desire to choose from a wide variety of beautiful models. Arvin gives you everything to sell profitably—three perfected superheterodyne sets with metal or glass tubes—overhead, in-the-set or separate case speakers—matching panel controls that fit perfectly, and at no extra cost—and all the sales helps you need to display, demonstrate and sell more car radios than you ever thought possible before. See an Arvin jobber for full information. NOBLITT-SPARKS INDUSTRIES, Inc., Columbus, Indiana. Also makers of Arvin Radios for the home and Arvin Hot Water Car Heaters.

Matching PANEL CONTROLS

with In-the-Set speaker models for you to sell as low as.....

\$39⁹⁵



Overhead SPEAKER MODELS

with matching panel or steering column controls as low as.....

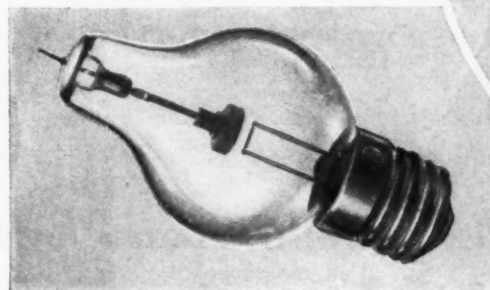
\$41⁹⁵

There's a TUNGAR to meet your needs

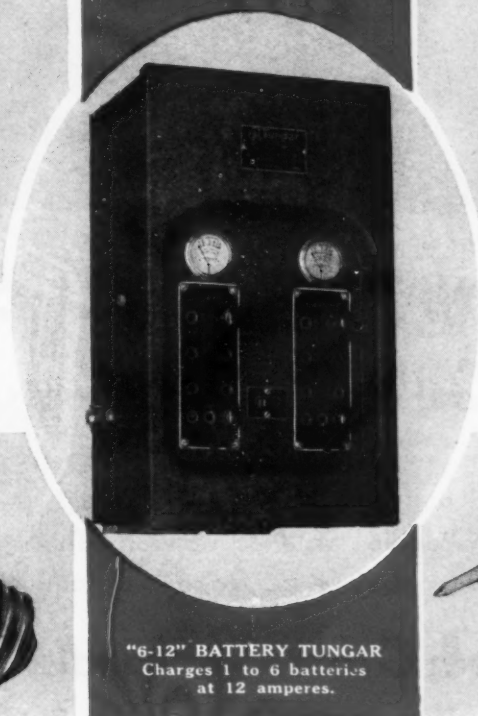


G-E PHOTOMETRIC BATTERY TESTER
New, modern, dependable, accurate.

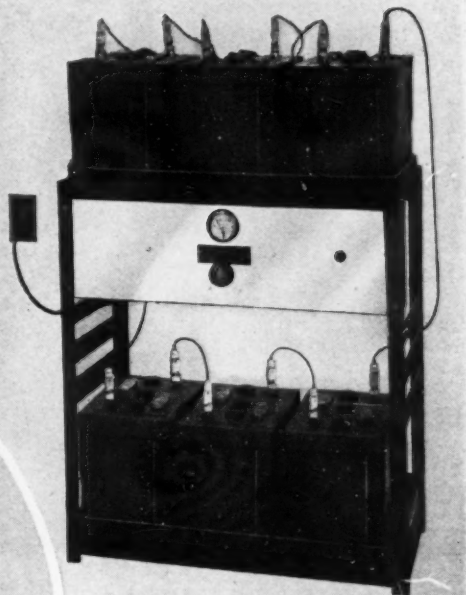
TUNGAR BULB
The heart of Tungar Chargers.



THE TUNGAR LINE OF TESTERS AND CHARGERS IS COMPLETE

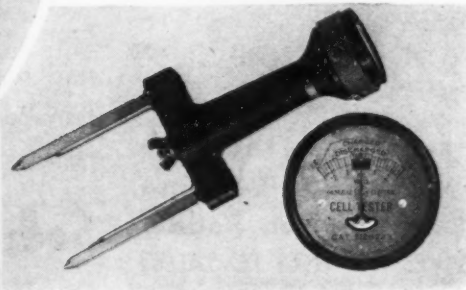


"6-12" BATTERY TUNGAR
Charges 1 to 6 batteries
at 12 amperes.



TUNGAR 6-BATTERY CHARGING UNIT
Also made in 3-battery capacity.

TUNGAR CELL TESTER
Rugged, convenient, accurate.



Today, as for the past 21 years, G-E Tungar Battery Testers and Chargers stand for quality, dependability and leadership.

There is a Tungar designed to meet the requirements of every garage, battery shop or service station . . . from the smallest to the largest. G-E Tungar Battery Testers and Chargers provide neat, compact and complete installations that are economical to own and to operate.

Install Tungars. Increase your battery charging business . . . your new-battery

sales . . . AND YOUR PROFITS. Mail the coupon NOW for full information on the complete line of Tungars.

Section A-723, Appliance and Merchandise Department,
General Electric Company, Bridgeport, Connecticut.
Please send me full information on the Complete Tungar
Line of Battery Testers and Chargers.

Name.....

Address.....

City..... State.....

GENERAL ELECTRIC

AUTOMOTIVE PRODUCTS

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.



Another TESTED SALES IDEA

Now Selling for Registered AC Stations

From everywhere, Registered Cleaning Stations report easier selling and big increases in sales through the AC Plug Cleaning Demonstration Paddle. And no wonder! This Paddle was tested and proved by retailers before AC made it a national selling tool.

Sells Other Merchandise as well as Spark Plugs

The Demonstration Paddle opens the way for a new plug sale. It also smooths the way, and provides the punch, for the plug cleaning approach to other sales! And how it does sell!

IT PAYS TO REGISTER with AC

This Spark Plug Cleaning Demonstration Paddle is the first of the 1936 series of tested sales tools that AC will provide—FREE—to Registered Cleaning Stations. Like the famous Bird Cage, it gives convincing proof that AC merchandising is made-to-order for retailers! The Paddle, alone, is reason enough why "it pays to Register with AC." But, here are two more—

- The Plug Cleaning Program is already backed by a \$2,000,000 investment in sales advertising and merchandising. This year, another million will be added. And—all through the year, the biggest national advertising drive in AC history will feature the Registered Station—to millions of car owners every month—and build bigger spark plug and other sales!

BE A REGISTERED AC CLEANING STATION
SEE YOUR AC WHOLESALE'S SALESMAN TODAY

AC SPARK PLUG COMPANY

FLINT, MICHIGAN • ST. CATHARINES, ONTARIO

Here's how the Free Spark Plug Cleaning Demonstration Paddle PAVES THE WAY TO SALES!

Equipped with three dirty plugs and one clean plug, the Paddle is handed to every customer. The dealer asks, "Had your plugs cleaned lately?" The answer is usually, "No." Then the dealer says, "Even at 3,500 miles, plugs get plenty dirty, as you can see from this Paddle. Cleaning only takes a few minutes, and it can save you as much as 1 gallon of gas in 10. The cost is only a nickel a plug." A plug cleaning sale usually follows—and, on the average, 2 NEW PLUGS ARE SOLD FOR EVERY 6 CLEANED!



50,000 REPAIR
SHOPS PREFER
THE POPULAR
SIMMONS LINE

•
Replacement
Parts for Ford
Chevrolet
and Plymouth
•

Silver King
Hydraulic
Jacks
•

Mufflers and
Tailpipes
for all Cars
•

Door
Handles for
all cars
•

Carburetors
for Popular
Cars
•

Brake Cables
for all
Cars
•

Brake Drums
for Cars
and Trucks

Always REPLACE DOOR HANDLES WITH **SIMMONS**

• • Each a Perfect Fit
• • Each a Perfect Match

When door handles need replacement, car owners want hardware that exactly duplicates the equipment provided with the car.

For that reason, it always pays to use Simmons quality door handles. No line is more complete—no handles are so sure to please your customers. Each is a perfect match for original equipment in appearance and service, made according to exactly the same specifications. Over 330 installations of both locking and non-locking handles are guaranteed to fit exactly the cars and models specified. First quality castings provide greater strength, heavy chromium-plating over nickel assures longer life. And car owners like the way these handles keep their bright finish.



WHEN YOU SAY—"THAT'S A SIMMONS HANDLE"—YOU'RE SAYING IT'S THE BEST. YOUR SIMMONS JOBBER CAN SUPPLY YOU.

Genuine
SIMMONS
REPLACEMENT PARTS AND EQUIPMENT

Independently Manufactured



SEND FOR COMPLETE ILLUSTRATED CATALOG FREE!

The Simmons Manufacturing Co., 3650 E. 93rd St., Cleveland, O.

Please send catalogs checked below:

- ☐ SIMMONS Parts for Ford, Chevrolet and Plymouth.
- ☐ SIMMONS Mufflers and Tailpipes for all Cars.
- ☐ SIMMONS Carburetors for Popular Cars.
- ☐ SIMMONS Brake Cables for All Cars.
- ☐ SIMMONS Brake Drums for Cars and Trucks.
- ☐ SIMMONS Door Handles for All Cars.
- ☐ SIMMONS Silver King Hydraulic Jacks.

NAME _____

CITY _____

STATE _____



Two right answers

TO THE GASKET PROBLEM



ARMSTRONG-VICTOR CORK GASKETS are made of live, resilient, sure-sealing cork. They are specially treated to prevent shrinkage, stretching, hardening, or distortion due to long storage or temperature changes. There's no fuss or bother installing them. The bolt holes always line up—always fit perfectly. And it's easy to select the right gasket for any job. The correct gasket number and part number are quickly found in the *Victor Gasket Guide* or price list. The gasket number is printed on each gasket and carton; or folders are clearly labeled with the gasket number, part number, and description.

ARMSTRONG-VICTOR CORKOLIN is made of live, sure-sealing cork reinforced with fabric to give extra strength and ease of handling. Corkolin won't harden, crack, or shrink. It comes in handy rolls from which you can cut any gasket you need, any time you need it. Corkolin is available in thicknesses of $\frac{1}{32}$ ", $\frac{1}{16}$ ", and $\frac{3}{32}$ ". For full information and prices on either of these profit-building items, see your jobber or write to Victor Manufacturing and Gasket Company, P. O. Box 1333, Chicago.

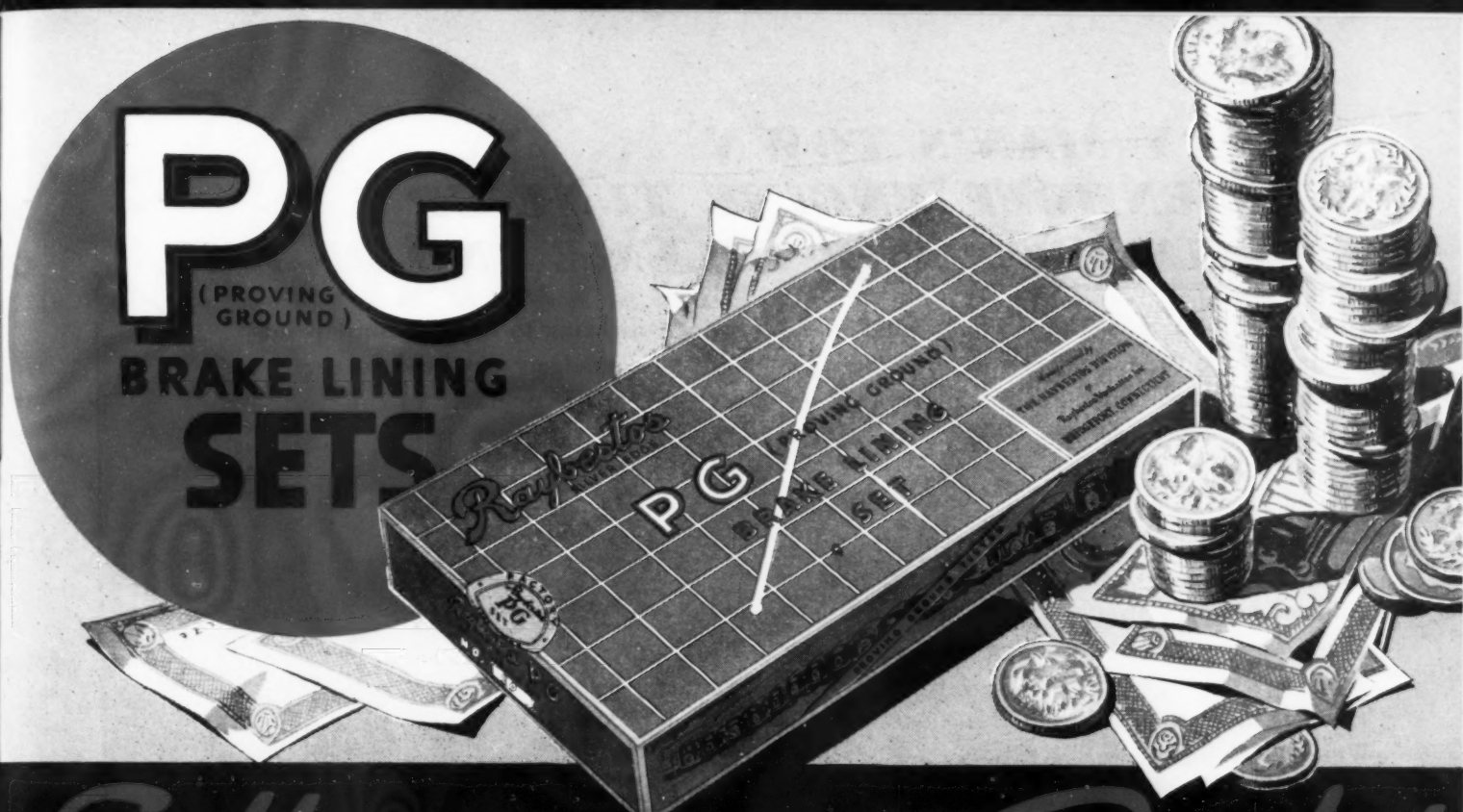


Armstrong - VICTOR

Cork GASKETS and Corkolin*

*Trade-mark reg. U. S. Pat. Off.

VICTOR MANUFACTURING & GASKET CO., World's Largest Manufacturer of Gaskets, P. O. Box 1333, Chicago, Illinois.



PG

(PROVING GROUND)

BRAKE LINING SETS

Sell **BRAKE LINING** *at a* *Profit*

WITH Raybestos PG sets, you can always get *your* price for a relining job . . . a price that enables you to make real money out of brake service.

Since the early days of the automotive industry, Raybestos has been the leader in the brake lining field. Car owners know Raybestos and the Raybestos reputation for *quality*.

Proving Ground tests, public acceptance and recognition by America's leading car manufacturers, create a constantly increasing demand for PG sets.

Powerful merchandising and a wealth of sales-promotional material complete the PG proposition which appeals to all servicemen, jobbers and dealers interested in selling brake lining at a *profit*, instead of a "price."

RAYBESTOS HEAVY DUTY PROGRAM

Here is another source of profit. Our Heavy Duty program is exceptionally attractive and includes a new talking picture, charts, diagrams and manual. Small investment for stock with quick turnover and large unit sales.

THE RAYBESTOS DIVISION

OF RAYBESTOS-MANHATTAN, INC.

BRIDGEPORT

CONN.

PG
Raybestos
SETS

**JUSTIFY A BETTER PRICE
FOR BRAKE WORK**

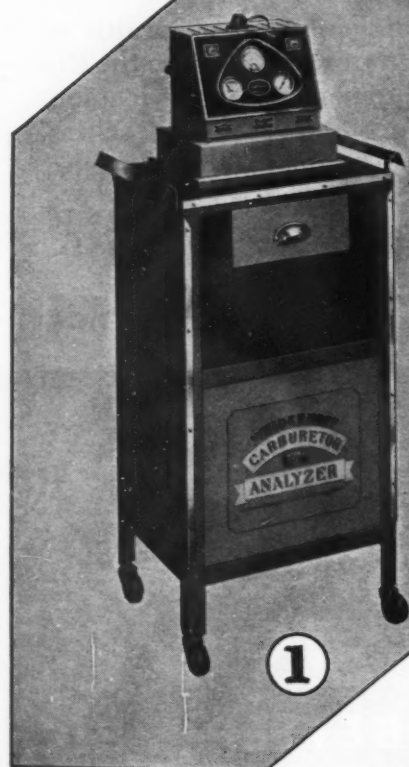
IN ANY MAN'S TOWN WEIDENHOFF ENGINE TUNE-UP IS A NATURAL FOR VOLUME AND PROFIT

How much volume and how much profit tune-up service will bring to any station depends primarily upon the efficiency of the equipment used. Trick gadgets may hold the car owner spell-bound once but never can and never will enable the operator to consistently lay his finger on the seat of trouble and say without hesitation, "That's it."

Developed through exhaustive research supported by sound engineering principles, Weidenhoff equipment has enabled thousands of service stations to build up a loyal following of tune-up customers which means volume and profit.

The big tune-up season will soon be here! A Weidenhoff jobber will gladly cooperate with you in selecting the equipment best suited to your needs.

CALL HIM TODAY



**JOSEPH
WEIDENHOFF, Inc.**

4340-4358 West Roosevelt Road
CHICAGO U. S. A.

Complete outfitters for battery, electrical and tune-up service. Battery charging and testing equipment, starter and generator testing equipment, growlers, magnetizers, coil testers, condenser testers, spark plug testers, generator and voltage regulator testers, fuel pump testers, carburetor float level testers, cell testers, *engine analyzers, ignition distributor analyzers, exhaust gas analyzers.*

Originators of "Certified Engine Tune-Up"

There is a
MARKED *difference*



....and

THERE'S THE MARK!



That's why . . . it is important to use only genuine

BENDIX DRIVE SPRINGS



When you have occasion to replace a Bendix Drive Spring, there's only a very small sum of money involved in the spring itself . . . but labor costs amount to more. So don't experiment with unknown springs—and perhaps have the job to do all over again!

Bendix, who invented and builds the world-famous Bendix Drive, knows *exactly* what the spring should be. The precise steel formula, tension, temper, shape and dimensioning have been developed during many years of building Bendix Drives for many million motor cars.

Every genuine Bendix Drive Spring is marked plainly with the name "BENDIX," stamped into the "eye." Look for it. It's there to protect you.

ECLIPSE MACHINE COMPANY

ELMIRA, NEW YORK

(Subsidiary of Bendix Aviation Corporation)

April, 1936

113

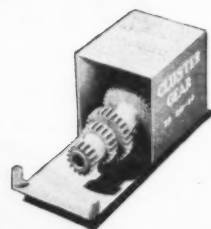
Insist on NEW PROCESS Gears

- They are of Highest Quality.
- They are the only Completely Packaged line of Gears on the Market.
- They come to you with **FREE RIVETS**.
- They have the acceptance of the Motor Car Industry.

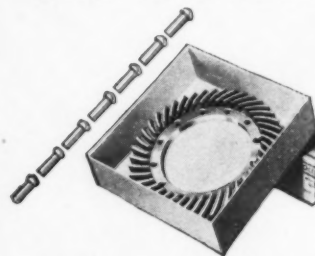
NEW PROCESS offers you a complete line of Replacement Gears including Transmission and Differential Gears as well as Steering Worms and Sectors. Each gear is neatly packed in a box and is supplied with **FREE RIVETS** of exact size, diameter and materials.

For nearly 50 years we have been making Gears — Transmission, Differential, Axle and Steering Gears for the Automotive Industry. We are today making Complete Differentials and Transmissions for America's leading motor car manufacturers. This is your guarantee of quality and workmanship.

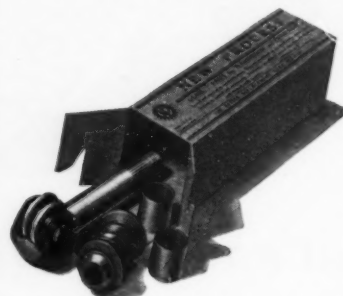
Insist on **NEW PROCESS GEARS** because of their acceptance by the motor car industry and because they assure absolute satisfaction on all your gear replacement jobs.



We are the first company to package a complete line of gears in tamper-proof boxes.



Each box contains **FREE RIVETS** for correctly installing the part.



Steering Gear Worm and Sector complete with Bushings.

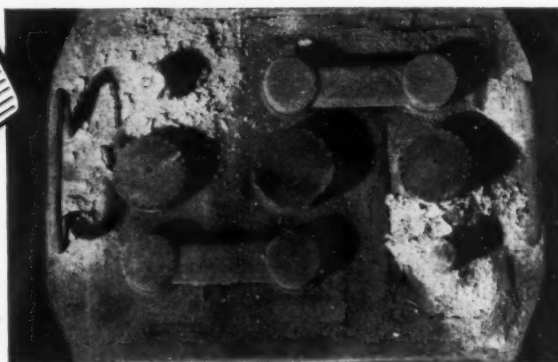


Our factory, covering the equivalent of three city blocks, is equipped with up-to-the-minute machinery which is manned by expert gear-makers.

The Better Replacement Gear Service.

NEW PROCESS GEAR CORP., SYRACUSE, N. Y.

Balks Corrosion



NEWTYPE

* COMPLETE LINE

NOKRODE BATTERY CABLE UNITS

IGNITION SETS

IGNITION CABLE
MERCHANDISING

SPOOLED WIRE

OILPROOF CORD

TERMINALS

CELLOPHANE WRAPPED
FRICTION TAPE

THE electrical circuit is the life blood of every car, truck, tractor, aeroplane or motor boat. Choke it and the finest engine is helpless. Corrosion of battery terminals and cable reduces the efficiency of the battery and chokes the current. The wise owner installs Nokrode Battery Cable Units, thus doing away with corrosion forever.

Dealers carrying Nokrode Battery Cable Units find a ready, easy and profitable sale. In addition New Type offers its complete line.* Talk to your jobber at once about New Type — the fastest-growing line in the automotive wire and cable field.

Send for our new Catalog No. 11

The Okonite Company
Newtype Automotive Division
Passaic, New Jersey

"Founded 1878 — over a half century of service"

The Only Flat Rate with 1936 car repair and tune-up data

Here's what you get
in the new
CHILTON Flat Rate



Price
\$6.00

**Send Check
and Order Direct**

**Or wait
for the
Chilton Man**

Total number of pages...	960	5 pages devoted to automatic chokes and fast idle adjustment
Total number of illustrations	309	Vacuum gage chart and table
Total number of Flat Rate operations	353	Fuel pump servicing.....
Number of car models with complete Flat Rate parts, prices and tune-up	499	11 pages devoted to servicing and adjusting steering gears
Number of 1936 models with Flat Rate tune-up prices	62	14 pages devoted to servicing and adjusting knee action units.....
Number of 1936 models with tune-up data	62	3 pages devoted to adjustment of generator charging rate and voltage and control units
Number of cars prior to 1930 (approximately 1925 to 1929) with Flat Rate prices	237	Flat Rates on refinishing and trimming
Number of cars prior to 1930 (approximately 1925 to 1929) with tune-up data	237	8 pages on front axle alignment table
Total number of models with Flat Rate prices..	798	19 pages of brake parts price table
Total number of cars with tune-up data	798	Serial numbers
Two colors used to distinguish major operations from minor operations		Factory parts list.....
Index system—New style quick locating		Factory parts numbers...
43 pages devoted to carburetor adjustment and calibration with illustrations		Service instructions on adjusting Hudson electric hand gear shifts...
		2 pages on servicing over-drive transmission unit
		1 page on adjusting automatic clutch unit.....

Buy the old reliable

Always First • Always Imitated • Never Duplicated
Buy CHILTON • Buy CHILTON • Buy CHILTON



**"YOU GET
ACTION WITH
A RELIABLE"**

... and it is easier action, with a greater lifting range. The stronger construction, longer service and better values in the Reliable Jack line are the result of 36 years of jack building leadership.

No. 600A

Double lift, with reinforced lifting members. Stands 5½ inches lowered; 13 9/16 inches raised. Capacity, 1 ton.



No. 5-71



No. 600A

No. 5-71

Greater lift in proportion to height than any other hydraulic. Capacity, 1½ tons.

No. 85

Short stroke. Saddle elevates to load without jacking. Total extended height 19½ inches. Capacity, 1 ton.



No. 85

No. 3H

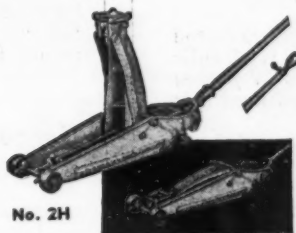
Two-speed pump. Every working part shielded. 48-inch handle. Lowers to 4½ inches and raises to 20 inches. Capacity, 3½ tons.



No. 3H

No. 2H

Lowers to 3¾ inches and raises up to 22 inches. Long handle, speed pump and overload safety device. Capacity, 2 tons.



No. 2H

Ask your jobber, or write us today for catalog of our complete line of service station equipment.

**RELIABLE
JACK COMPANY**

Builders of Dependable Jacks for 36 Years
1401 West Second Street Dayton, Ohio

heads

VIS-AID

YOU WIN

SAY "turn on your lights, please"
CHECK each bulb carefully
REPLACE all worn out bulbs
SELL spares to every car

tails



STOP

WINX

YOU WIN

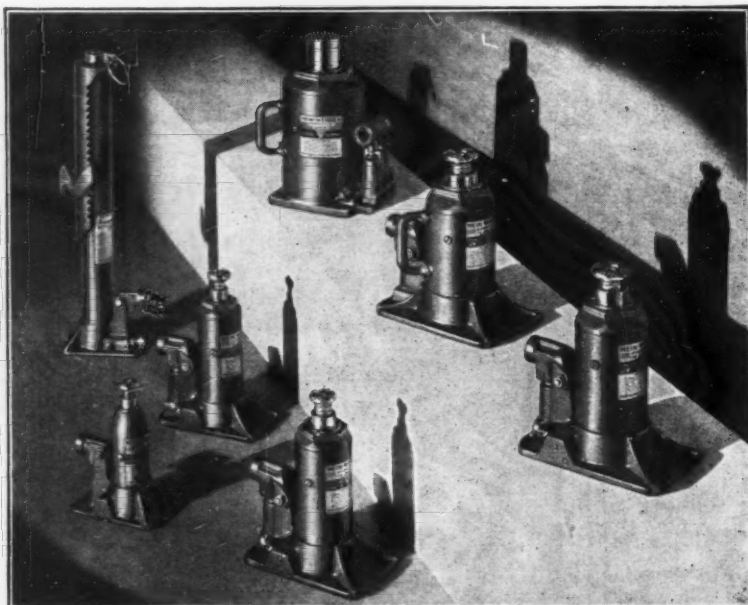
Sell TUNG-SOL bulbs. Push WINX, the new lamp bulb that blinks, and Vis-Aid, the new and better headlight bulb. You'll make more money...please more customers...promote greater safety. Ask your TUNG-SOL jobber about this.

TUNG-SOL

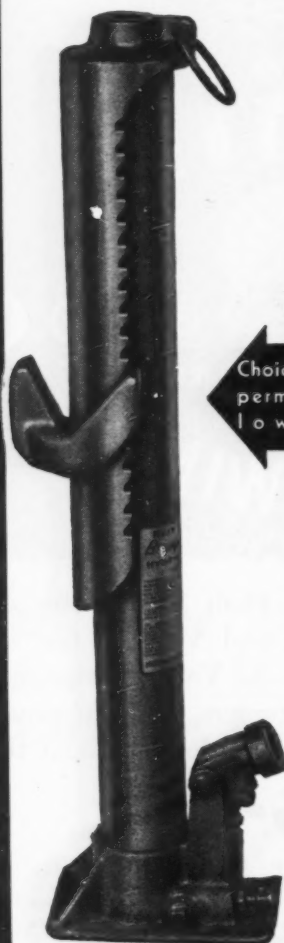
TUNG-SOL LAMP WORKS • INC.

SALES OFFICES: Atlanta • Boston • Charlotte • Chicago
Cleveland • Dallas • Detroit • Kansas City • Los Angeles • New York
Philadelphia • Rochester • GENERAL OFFICE: Newark, N. J.

NOT A DUSTCATCHER IN A CARLOAD



Complete Line of H-W Hydraulic Jacks Is Built Right and Priced Right



Choice of 18 adjustments
permits wide range of
lows and highs

You can outsmart competition with this set-up. . . . And it's no wonder. . . . These Hein-Werner Jacks win instant favor. They virtually sell-on-sight, assuring a quick stock turn instead of gathering dust on a shelf.

"Bullet" 1½ ton capacity model is a sensation at new, low price of \$2.80 (West Coast \$3.10) . . . 3 ton models at \$7.95 (West Coast \$8.45) . . . 5 ton models at \$9.95 (West Coast \$10.65) . . . 7 ton models \$13.45 (West Coast \$14.50) . . . 12 ton models at \$19.95 (West Coast \$21.00) . . . and NEW 20 TON MODEL \$30.00 (West Coast \$31.00) . . . All prices are net to dealer.

New Model BUMPER-LIFT

\$4.95

Net to Dealer

Here's a natural! The unprecedented popularity of the Bumper-Lift Hydraulic Jack, designed and pioneered by H-W *proves* that owners of new cars *want* and *need* this type jack.

New design incorporates universal hook that can quickly and easily be positioned to any one of 18 different lows. Hooks under bumper arm of modern cars. No need for motorist to get on knees or crawl under car to position or operate this jack. . . . Dealer price now only \$4.95 (West Coast \$5.65).

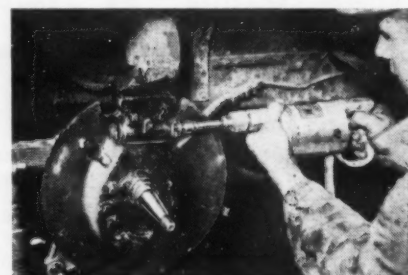
HEIN-WERNER MOTOR PARTS CORP.
WAUKESHA, WISCONSIN

FEW MODELS ENGINEERED TO DO THE WORK OF MANY

HEIN-WERNER
hydraulic JACKS

Ammco Introduces New Brake Cylinder Hone

The new Ammco brake cylinder hone is designed to take care of hydraulic brake cylinders under 1 in. in diameter, as the tool has a range from ¾ in. to 1¼ in. Operated by a



small electric drill, it uses abrasive stones for grinding, and as shown in the illustration, the work can be done without removing the brake cylinder from the chassis. It is claimed that this tool will remove corrosion and roughness from the wall, restoring the original mirror surface. This hone is a product of the Automotive Maintenance Machinery Co., 2104 Commonwealth Ave., N. Chicago, Ill.

What! No Clearing House?

Possibly you have searched for the Readers' Clearing House in this issue, and when you didn't find it, wondered "how come?" The answer is that there wasn't room for that department this month.

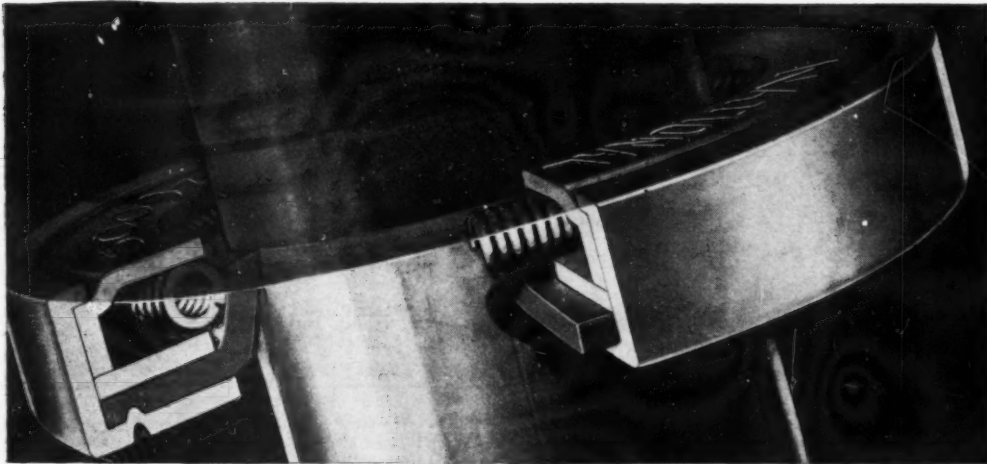
In order to present up-to-the-minute service stories, spring and summer merchandizing hints, suggestions on getting cleaned up for the volume of business everyone expects during the coming months, and to give you practical 1936 tune-up information, it was necessary to use the space usually occupied by the Readers' Clearing House.

Bill and Hank, Clearing House engineers, want you to know that they will be back next month with the helpful suggestions you have been in the habit of looking forward to. So watch for the Readers' Clearing House every month from now on.

Harco Greas-Off Makes Grease And Dirt Disappear

Greas-Off is a highly concentrated product which can be diluted with three to four parts kerosene or fuel oil. This solution can then be brushed or sprayed on the body, chassis or other part to be cleaned, and the dirt, grease and grime will be quickly dissolved. Either hot or cold water may be used for rinsing. This solution may also be used to clean the garage floors.

Harco Greas-Off, which sells for \$2.50 a gallon, is a product of the Harley Soap Co., 2832 E. Pacific St., Philadelphia.



LEAKPROOF SEALS for

FRONT WHEEL AXLES
REAR WHEEL AXLES
PINION SHAFTS
BRAKE HUBS
TRANSMISSION SHAFTS
CRANKSHAFTS
SPEEDOMETER GEARS
CLUTCHES
WATER PUMPS
FREE WHEELING UNITS

USE OIL SEALS ON EVERY OVERHAUL JOB!

EVERY MOTOR CAR is equipped with Oil and Grease Seals but repair shop operators frequently overlook the fact that the Seals need replacement at time of overhauls. Leakage of oil and grease reflects upon the quality of your workmanship. It is particularly essential to install new Seals when you perform the 10,000-mile lubrication job and when brakes are relined, otherwise the job is incomplete. Your customers will readily approve the purchase of new Seals when you briefly explain the advantages.



CORK, FELT AND LEATHER WASHERS

All National replacement washers are packed in cellophane—in matched pairs. They reach you factory-fresh.

NATIONAL MOTOR BEARING CO., Inc.
1113 78th Avenue Oakland, California

FACTORY WAREHOUSES:

ATLANTA, GA., 95 Pine Street
BOSTON, MASS., 664 Commonwealth Avenue
CHICAGO, ILL., 1723 So. Wabash Avenue
CINCINNATI, OHIO, 717 Sycamore Street

DALLAS, TEX., 1905 Canton St.
KANSAS CITY, MO., 402 East 14th Street
LOS ANGELES, CALIF., 1243 South Hope Street
NEW YORK, N. Y., 245 West 67th Street

A NECESSITY
for a complete job
ADD PROTECTION
to your work
EASY TO SELL
to your customers
INCREASE YOUR
replacement sales

National first introduced oil seals to the replacement trade six years ago. The quality and accuracy of their product has long been recognized by leading jobbers and dealers throughout the United States. National Seals are exact factory duplicates made in strict accordance with car manufacturers' specifications for all cars and trucks, and are conveniently packaged in pairs properly identified for ease in handling.



**EVERY NEW BRAKE LINING JOB NEEDS
NEW SEALS**

For 47 Makes of Cars and Trucks

Auburn	Jordan
Buick	LaSalle
Cadillac	Marquette
Chandler	McCormick-Deering
Chalmers	Nash
Chevrolet	Oakland
Chrysler	Oldsmobile
DeSoto	Packard
DeVaux	Paige
Dodge	Peerless
Durant	Pierce-Arrow
Erskine	Plymouth
Essex	Pontiac
Falcon-Knight	Reo
Ford	Rickenbacker
Franklin	Rockne
Gardner	Star
GMC Truck	Studebaker
Graham	Twin Coach
Hudson	Viking
Hupmobile	Whippet
International	White Truck
Jewett	Willys
	Willys-Knight

Also for tractors, Diesels — for every application on moving shafts.

STEER-O-MASTER

MODEL B

Available under easy monthly time payment contract.

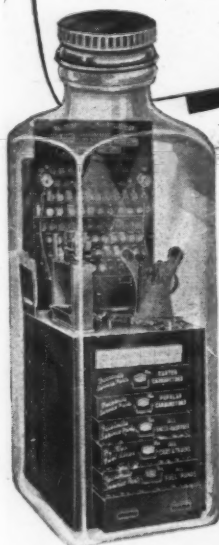


A new low-priced wheel alignment service unit, complete with all tools and equipment necessary for checking and correcting. No other service needed. Write for full description and price.

RIESS MANUFACTURING CO., Kokomo, Indiana

Rx

As a Spring Business Tonic
let us prescribe the
**HYGRADE
5-POINT
SERVICE UNIT**



SHOPS that have felt the drop in general overhaul will find Hygrade's 5-Point Service Unit a wonderful Spring business tonic. It is the most powerful sales stimulant ever offered to the automotive repair trade.

A combination of Clinic, Testing Table, Work Bench and Parts Cabinet with all the requisite testing devices for rendering a complete overhaul service in these highly profitable specialized fields:

**CARBURETORS
FUEL PUMPS
SHOCK ABSORBERS
SPEEDOMETERS
(Tips, Shafting and Casing)
FUEL AND OIL LINES**

The 5-Point Service Unit is a unique outfit that virtually starts the Repair Man in five separate departments of overhaul—each a paying business in itself! Wherever introduced it has proven a top notch money maker.

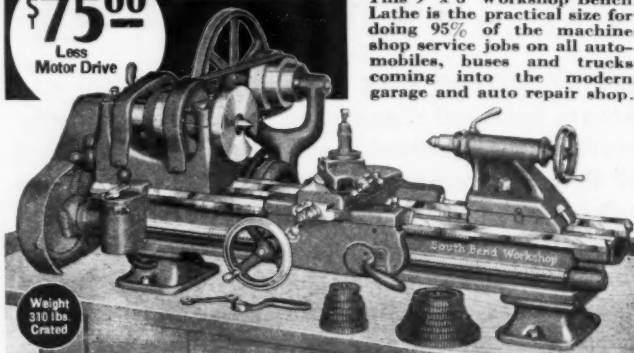
REMEMBER—EVERY "PRESCRIPTION" EVER OFFERED BY HYGRADE IN THE PAST HAS TURNED OUT TO BE A HEALTHY SALES TONIC.

From your Jobber or write us for particulars if he can't supply you, being sure to send his name.

HYGRADE PRODUCTS CO.
516 West 34th St., New York, N. Y.



New 1936 Model
Genuine **SOUTH BEND**
**9" x 3' WORKSHOP
LATHE**
\$75.00
Less
Motor Drive



9 1/8" x 3' Workshop Lathe with Horizontal Countershaft, 1/4 h.p. Reversing Motor, Switch and Belting as shown. **\$98.25**

**Trues Commutators . . . Refaces Valves
Makes Bushings . . . Finishes Pistons**

10 New Features: Include Twin Gear Reverse for Right or Left Hand Screw Threads and Automatic Longitudinal Feeds to carriage; Ball Thrust Bearing on Headstock Spindle; New, improved Tailstock; New improved Compound Rest and improved Back Gears.

The most valuable, useful and versatile machine in any auto repair shop and in addition can be fitted with 38 practical attachments for doing all kinds of special jobs.

Easy Payment Terms over an extended period of time can be arranged. Complete information on request.

WRITE FOR THIS NEW BOOK

Showing above lathe in 8 different drives and 4 bed lengths. Ask for No. 15-T. Sent Free.

SOUTH BEND LATHE WORKS

888 E. Madison St., South Bend, Ind., U.S.A.

SOUTH BEND Precision LATHES

GET READY NOW

TO

1. SET VOLTAGE REGULATORS
2. ADJUST GENERATORS
3. CHECK DASH AMMETERS
4. LOCATE IGNITION SYSTEM TROUBLES

These adjustments are quickly and easily made with this time, trouble and temper saving instrument. The meter is a precision type moving coil movement so calibrated that it may be read to 1/10th volt accurately at 2% of the scale. The case is smooth, strong bakelite. This handy instrument may be conveniently carried in the pocket for immediate use at all times.

THE BURTON-ROGERS CO., 755 Boylston St., Boston, Mass.

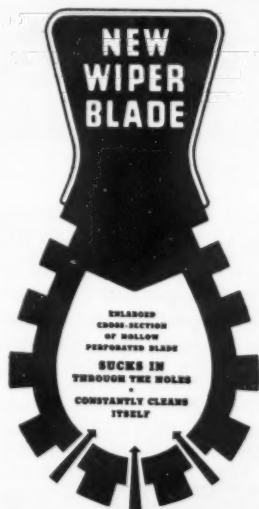
Sales Div. Hoyt Elec. Inst. Wks.

Gentlemen: Kindly send me more information about the Hoyt GT-4 Generator and Voltage-Regulator Tester.

Name Street
City State



REVOLUTIONARY



Actually WIPES CLEAN!

Ninety per cent of your customers want a better wiper blade. Here it is!

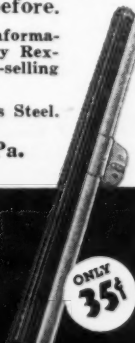
Any motorist who picks it up will buy it. He can see at a glance that this carbon-base rubber blade, with its perforations and flexible wiping ribs, will keep his windshield cleaner and drier than ever before.

Write for complete information on this revolutionary Rex-Hide blade. It's a fast-selling profit-maker!

*All Metal Parts Stainless Steel.

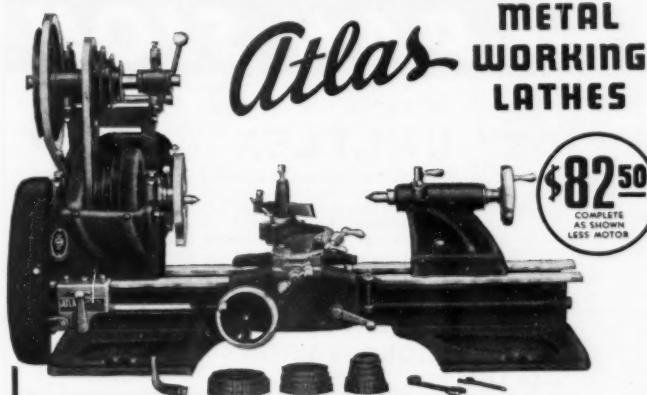
REX-HIDE, INCORPORATED, East Brady, Pa.
Makers of Rex-Hide Carbon-Base Brake Lining

Rex-Hide
Balloon PERFORATED
WINDSHIELD WIPER BLADE



ONLY
35¢

NEW! MODERN!



METAL
WORKING
LATHES

\$82.50
COMPLETE
AS SHOWN
LESS MOTOR

MORE PROFIT FOR YOUR REPAIR SHOP!

With this new Atlas lathe you can handle the really profitable automotive repair jobs—piston finishing, connecting rod boring, armature and mica undercutting as well as scores of other types of work. Attachments are available for doing many machine shop operations. It has 10 1/4" swing. Takes 18" between centers. Back geared. Automatic reversible power feeds. Cuts 4 to 96 threads per inch. Threading dial. Graduated tailstock ram. Self-contained counter shaft. V-Belt drive and many other features supplied as standard equipment. Sold in 4 different bed lengths 36", 42", 48", 54".

Sold on monthly payments. Two weeks' trial. Send TODAY for FREE catalog and information on Atlas lathes, drill presses, tools and attachments.

ATLAS PRESS CO.
445 No. Pitcher St.
KALAMAZOO, MICH.

DISPLAYS AT
New York City, 130 W. 42nd St.
Chicago, 35 E. Wacker Dr.
Philadelphia, 113 N. 3rd St.

YOUR SHOP WILL DO Much BETTER with the "KING System" OF MOTOR TUNE-UP

You will do MUCH BETTER in TWO ways:—you will render BETTER service and do MORE business. Don't think that you are ahead by not having the "KING System" in your shop because we KNOW that customers, one after another, just naturally go to shops that render 100% service. There is a "KING" unit to fit any size shop;—a wide price range. They can be purchased on EASY DEFERRED PAYMENTS. Hundreds of shops have paid for the "KING System" of Motor Tune-up from increased earnings. Mailing Cards and Newspaper Advertising will attract NEW customers and OLD ones too.

CHECK "KING" METERS

Don't fail to check the "KING" Meter. It is a very important exclusive "KING" feature. It ELIMINATES all GUESS WORK by showing DIRECT readings on Meter. You get the CORRECT answers in black and white like your watch tells the time. In addition to other tests, the "KING" MT-210 will make the following:—Coils, Relays, Starter, Battery, Generator, Fuel Pumps, Spark Plugs, Condensers, Cut-outs, Cables, Ground, Complete Ignition, Voltage Regulators, Cylinder Compression and Bulbs (All Types). Accurate D'Arsonval (moving coil type) ammeter and voltmeter are provided for making the critical adjustments in voltage regulators, generators, cut-outs, etc.—a 1/4-ohm rheostat is also incorporated for setting exact voltage.



"KING" MT-210

\$245.00

Sold on

Deferred Payments

Ask Your Jobber or Write Us Jobber's Name

The ELECTRIC HEAT CONTROL Co.
9123 INMAN AVE., CLEVELAND, OHIO

KING • Good Products Since 1914 • KING

ALUPAK

HEAD GASKETS! REMARKABLE RECORD IN 2000 TOUGH JOBS

Within the past four months—more than 2,000 repairs from every state, answered our offer to send a FREE Alupak Head Gasket for their toughest jobs. Practically half of these shop owners have already written in to say:

ALUPAK

"Alupak Head Gaskets do everything they are claimed to do. We'll use them in the future."

Alupak Head Gaskets used in your next tough job will safeguard you against extra work and adjustments.

Most likely, your jobber carries the line; but if he doesn't, write us and we'll tell you who does.

FELT PRODUCTS
MFG. CO. 1528 Carroll Ave.
Chicago, Illinois

\$99⁵⁰

PRICED TO MEET
POPULAR
DEMAND

BESCO Every Feature Motor Tester
A MASTER MERCHANDISER
AND SERVICE BUILDER

Exclusively Featuring

Telephone Type Jacks and Plugs
Visible Motorized Breaker
Precision Spark Gap
0-10 Volt Meters
0-600 and 0-30 Ammeter
A-C Condenser Meter

A new and sensational tester engineered correctly for quality, originality and attractiveness. An effective and profitable merchandising force for replacement parts and labor.



WRITE for
CATALOG
and complete infor-
mation. New 1936
Edition Now Ready.

MODEL
707

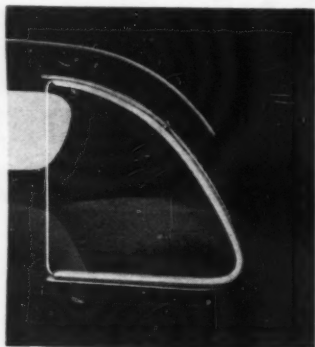


BESCO PRODUCTS, Inc.

7525 GREENWOOD AVE.

CHICAGO, ILL.

FULTON ALL-WEATHER WINGS



Chrome plated, brass attaching brackets serve as rain shields to prevent rain, snow and dust being blown in at top or bottom. Flexible rubber weather strip on lower edge of rim also guards against any possibility of chipping window glass should window be raised when wing is turned in. Easily operated by hand. No obstructing posts. Safety glass. The last word in comfort, convenience. \$11.00 per pair.

THE FULTON CO.

1912 S. 82nd St.
Milwaukee, Wis.

Genuine **NIEHOFF**
PRODUCTS
Approved Quality
IGNITION PARTS
Coils · Condensers · Brushes · Gears
Brake Parts · Cables · Cutouts
Testing Equipment
C.E. NIEHOFF & CO.
230 W. SUPERIOR ST., CHICAGO

MAIL TODAY
FOR FULL
PARTICULARS

Name _____
Address _____
City _____ State _____

• PLAY SAFE •



Quality
ARMATURES
COST NO MORE!

ASK FOR BY NAME

It costs no more to buy Quality AR-NU Armatures than unknown makes. All you do is ASK FOR AR-NU Armatures. No difference in cost but a VAST difference in customer satisfaction. Over a period of years experienced repairmen have developed a liking for AR-NU Armatures because they have proven so universally satisfactory. Made ENTIRELY of NEW materials. Ask for AR-NU Armatures next time.



ASK YOUR JOBBER FOR 1936 CATALOG

It will pay to have our New 1936 Catalog. It covers nearly 500 different types that fit more than 3,000 Armature Listings in our 1936 Catalog. Your copy will be supplied by your Jobber.

Ask Your Jobber or Write Us

THE ARMATURE CO.

7500 Stanton Ave.

Cleveland, Ohio

**CONTROL PISTON
E-X-P-A-N-S-I-O-N**

With

"JOE" UNI.FLEX

It's easy to expand pistons to a precision fit when you install "Joe" Uni.Flex Skirt Expanders. Simply take screw driver—and make perfect adjustment. Eliminate drag—insure piston flexibility.

ADJUSTABLE • UNIVERSAL

One size fits all pistons. Thousands of satisfied users. List price 50c. Ask your jobber. Write us for booklet.

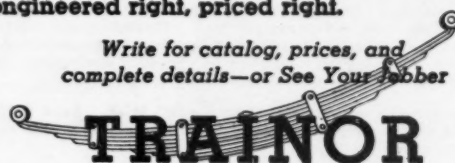
LINENDOLL CORPORATION

228 N. LA SALLE ST. CHICAGO, ILL.



★ A complete line of replacement springs, helper springs, and spring parts for all popular makes of cars and trucks. Built right, engineered right, priced right.

Write for catalog, prices, and complete details—or See Your Jobber



NATIONAL SPRING COMPANY

New Castle, Indiana

Lubrofacts

FOR APRIL
By C. C. CURTIS,
Lubrication Engineer
HALSTEAD PRODUCTS COMPANY

SPRING TIME IS TUNE-UP TIME

Back in the old days sulphur and molasses made its appearance along with the robins as the traditional spring tonic for both young and old. Sassafras tea was also one of the old stand-bys for purifying the blood. But times have changed. Humans don't seem to need the tonics prescribed by the almanac and grandmother, but the urge to get out onto the open road is a normal reaction of spring fever. On the other hand, it's the automobile that now needs a spring tonic in the way of an effective purge following an overhaul. It's a good season for the automotive business.

April is the time to cash in on spring car-cleaning. After a winter's use of sluggish oils in the crankcase with their gum-forming tendencies, carbon deposits and what have you, every car owner is in a receptive mood to have his motor purged—tuned-up and re-powered, ready for service.

Particularly is it necessary to purge modern motors, but ordinary lubricants do not embody the proper characteristics to free the upper cylinder area. Close tolerances of valve stems and the high speed and high compression of modern motors require use of a special tune-up oil that will penetrate and provide an active solvent to dissolve the resinous carbon-binding materials without attacking the surface of the metal.

A TUNE-UP OIL FOR PURGING MOTORS

Halstead lubrication engineers have developed a special upper cylinder oil that does the work instantly, effectively—and actually dramatically. You pour a pint of Halstead Tune-Up Oil slowly into the carburetor suction. It penetrates all friction parts in the upper cylinder and purges the carbon and sticky gums through the exhaust. It makes a good tune-up job perfect. Sluggish motors respond instantly. More power is put into the engine. Hill-ping leaves the motor and smooth performance will ensure a repeat customer.

Have your Jobber send you a few cans. For Literature write to Halstead Products Co., 2937 Chapman St., Oakland, Calif.

HALSTEAD ...the
BIG 4
Lubro-Aids

HALSTEAD SPRINGEEZ OIL
—all-purpose utility oil

HALSTEAD TUNE-UP OIL
—for purging & tuning motors

HALSTEAD ADMIX OIL
—for break-in service

HALSTEAD GRAPHITE OIL
—for old & worn motors

Sealed Power Offers

New "Silent Salesman"



To help repairmen sell re-ring jobs, Sealed Power Corp. has prepared a "Tabloid Engineering Discourse" entitled "How to Cut the Cost of Repowering My Car"—a ten-page booklet, "chock full" of real engineering truths explained in a simple, convincing, non-technical manner which is building business wherever the booklet is used.

The back cover of the booklet is die-cut so it can be hung on the choker button. Sealed Power also has arranged to imprint the repair shop's own advertisement on the back cover featuring any four of the specialized services which the repair shop offers.

Walz Handling Power Brakes

Vel-Vac power brakes are now represented in the Middle Atlantic territory by C. Harry Walz, according to an announcement recently made by Vacuum Power Equipment Co. of Detroit. Walz with his crew will handle all sales in Virginia, Delaware, Maryland, Washington, D. C., New Jersey, and eastern Pennsylvania, with headquarters in Philadelphia.



ENGELHARD Tel-Lite panel, made by Charles Engelhard, Inc., Newark, N. J., has two 10-in. bull's eyes, one marked "Engine O. K." and the other "Check Ignition, Carburetor, Valves." This panel, which is essentially a mercury vacuum gage, shows the owner by means of lights any variations in manifold vacuum.

GASKET GOO

GASKET GOO

MAKES JOINTS LEAK-PROOF

GASKETS can be squirted out of this tube of GASKET GOO more quickly...and more cheaply...than by buying or making cut gaskets.

NO OVER-CEMENTING! • NO LEAKS!

PEP

GRINDS THE HARD STEEL SEATS

VALVE GRINDING, now that many cars use the hard steel seats, requires a compound that really grinds—not just polishes...PEP is the fastest cutting compound that leaves a perfect finish on both steel and iron valves and seats.

SEND COUPON NOW FOR FREE SAMPLE

Attach Business Card or Bill-Head for a Big Sample

PEP MFG. CO., INC., 33 WEST 42nd ST., NEW YORK

Check Free Sample Wanted

☐ GASKET GOO ☐ PEP GRINDING COMPOUND

Name _____

Address _____ MA4

"HOT SHOT" is right
Says George



This Grease Tool

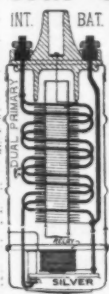
95¢

stops the most stubborn spring squeaks instantly. Drive pointed end between leaves, attach grease gun and force grease right where it squeaks. Order today.

National
MACHINE & TOOL CO.
JACKSON, MICHIGAN

CAR OWNERS NEED IT!

The VOGUE DUAL RATIO COIL




Carefully engineered dual windings controlled by automatic voltage relay. Full hot spark even if input varies from 3½ to 7 volts. No special condenser necessary. The last word in coil construction. Thousands in use on passenger cars, trucks, busses, tractors and marine engines. The exclusive patented construction gives the VOGUE Ignition Coil what the impulse starter gave the magneto. Ask your jobber or write us today for full details. It will pay you.

VOGUE ELECTRIC CORPORATION
1438 W. Lake St. Chicago, Ill.

TRADE MARK

NOC-OUT
HOSE CLAMPS



THE HOSE CLAMP WITH THE THUMB SCREW

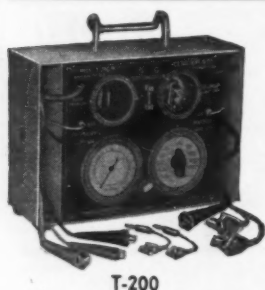
Standard equipment of the automotive industry. Adjustable - one size equals many. Quick tightening, perfect seal. At all Jobbers.

Pat. No. 1,382,813.

WITTEK MFG. CO.
4305 W. 24th Pl., Chicago, U.S.A.

Buick Fight Broadcast

Harlow H. Curtice, president of the Buick Motor Co. has announced that Buick will sponsor the broadcast of the Schmeling-Louis fight, scheduled for New York this summer. Contracts have been signed for a nationwide broadcast of the heavy-weight match.



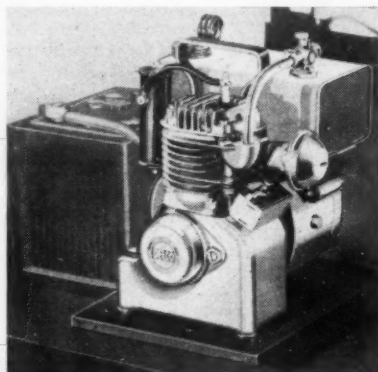
T-200

motor driven breaker . . . preheats coils . . . spark gap readings in millimeters . . . many other valuable features . . . Low Priced . . . WRITE FOR PARTICULARS.

C.E. NIEHOFF & CO. 230 W. SUPERIOR ST. CHICAGO, ILL.

Delco Battery Charger Carried With One Hand

Simplicity and portability are said to be the two outstanding features of the new Delco plant for charging batteries. A single-cylinder, air-cooled



engine is direct connected to a six-pole, 150-watt generator of either six or twelve-volt design. The engine is of the four-cycle, "L" head type with a bore of 1 9/16 in. and a stroke of 1 5/8 in. and has a speed of 2250 r.p.m. The two-quart gasoline tank is directly over the generator and the carburetor, with a needle valve adjustment is mounted on the tank cover. The cooling fan is on the crankshaft. The weight of the entire unit is 44 lb. The Delco plant, according to United Motors Service, Inc., Detroit, is particularly designed for charging radio and automobile batteries and for use on boats, trucks, wrecking cars, etc.

Champion Sealing Compound Not Affected by Heat

The Champion Spark Plug Co., Toledo, Ohio, announces a new material used in sealing the center electrode in the bore of the insulator in Champion plugs. This dry powder cement, known as Sillment, is applied in the form of microscopic pellets, a small pinch at a time being metered around the center electrode by an automatic machine. A feature claimed for this material is its low rate of expansion, which makes it possible to maintain this tight joint under all conditions of service. According to Champion engineers, a Sillmented plug will retain its original thermal rating or heat range.

NIEHOFF PORTABLE IGNITION TESTER

Sells service work . . . assures extra profits . . . tests coils, condensers, etc. on car whether engine is running or not. Battery operated . . .

LINKERT

The
WORLD'S OUTSTANDING
CARBURETOR

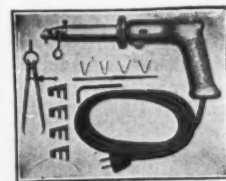
and
PERFECT PARTS

Replacement Line
for All

Popular Carburetors

LINKERT CARBURETOR CO.
INDIANAPOLIS, INDIANA

Double Your Tire Grooving PROFITS



Only the New Champion gives you the exclusive, removable heating element — readily replaced by operator. Champion blades are adjustable for both depth and width. One hand control. Easy to operate. Heats quickly. Works fast.

For bigger tire profits, write for free folder.
ALLIED MANUFACTURERS, INC.
408 River St., Ypsilanti, Mich.

Pulls Stubborn Gears without STRAIN



MAYO 3 - A pulls a varied assortment of jammed or rusted gears, pinions, etc. Simplified construction insures a straight, sure pull up to 10 tons without strain. Will cut repair time and boost the profits of even the smallest shop. See your jobber or write direct.

\$7.50 delivered

Springfield Wheel Puller Co.
510 Hubert St. Springfield, O.

STEELCRAFT



PISTON RING

Fits tapered and out-of-round cylinders without reborring. Restores compression, stops loss of oil and increases gasoline mileage.

Write for
Particulars

Steelcraft Piston Ring Sales, Inc.
1017 Franklin Street, Detroit, Michigan

Good Electric Soldering Irons



Mean More Profit to You

Electric Soldering Iron Co., Inc.
342 West 14th St. New York City



Complete Your Check-ups with QUICK . . . ACCURATE SCIENTIFIC . . . LOW COST BRAKE SERVICE



The **EVANWOOD**
brings this service for
\$44.50 COMPLETE
LIST NO EXTRAS

You can guarantee this service and without tying up your customers' cars. Easy to operate. Requires only few minutes per car. Compact. No space needed.

Dial gives exact condition of brakes **INSIDE** the drum—each wheel separately—wet or dry tires—regardless of tire pressure—all tire dimensions up to 34 inches. Does everything high price machines do—quicker and accurately.

Order your Evanwood today. Profit by increasing public and official demand for safe brakes.

**BALANCE BRAKES
CHECK LINING . . . DRUMS
AND BRAKE CONNECTIONS**

FREE—Big Outside Advertising Banner

Descriptive circular on request

C. & C. SALES CORPORATION

Exclusive Sales Agents for U. S.

General Motors Building

1775 Broadway

New York City

EVANWOOD
Safety BRAKE
TESTER and BALANCER

The truck-size Evanwood tests from and including 20 x 650 to tires measuring 46" overall—Price \$69.50.

Joe Dawson Heads Philly Servicemen's Association

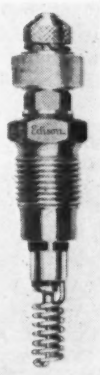
Joe Dawson, former Indianapolis speedway racer, was elected president of the Automotive Service Assn. of Philadelphia at the fifteenth annual meeting held March 23 in the P.A.T.A. headquarters, where the service body is an affiliate.

Dawson, who has been treasurer of the service group for several years, succeeds Fred C. Nicholson as president, the latter being elected to the board of directors. Dawson was president of the A.S.A. in 1929 and 1930. He is owner of Marmon-Philadelphia Service.

Others elected for one-year terms follow: First vice-president, August Wilkening, Motor Parts Co.; second vice-president, Ed. Munz, president, Munz Brothers; treasurer, John L. Palmer, treasurer, Auto Equipment & Service Co.; secretary, William P. Berrien, executive secretary, Philadelphia Automobile Trade Assn.

Edison-Splitdorf Glow Plug Aids Diesel Starting

To aid in cold starting of Diesel engines, the Edison-Splitdorf Corp. of West Orange, N. J., has developed a glow plug which screws into the combustion chamber and supplies heat to fire the mixture. These plugs, which are of the double electrode type, are wired in series to a 24-volt battery with a resistance indicator and switch in the circuit. Current is allowed to flow for 15 to 30 seconds before starting, and this heats the coils of the plugs to approximately 2000 deg. Fahr. The Edison plugs are mica insulated and are so constructed that if the resistance coils burn out they can be replaced.



B & B Defroster Blows Warm Air Across Windshield

The B & B defroster can be mounted in any position on the windshield by means of a large vacuum cup on the back. A small vacuum motor fan blows warm air across the windshield, melting snow and ice on the outside and removing any steam from the inside. A toggle switch controls the heating element and a pilot light indicates when the heat is turned on. The fan has a two-speed control, the fast position being used for country driving or extreme conditions. A control box, mounted on the dash, contains the electrical and vacuum connections, so that the defroster can be removed and stored when not in use. This device, which sells for \$6.75, is a product of the Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland, Ohio.

BUTLER, MO.
SERVICE MAN SAYS:

**"DOES
SAME WORK AS
EQUIPMENT
COSTING \$100"**

Standix Cartridge Lubrication is not merely another system of lubrication, but a basic development in lubricating methods. A complete lubrication outfit at about the cost of a single gun!



The Clean Low-Cost System You've Been Waiting For—

Never before has it been possible, with one gun, to service all fittings, and to handle all types of lubricants.

Never before has there been such a **CLEAN** system. No mess—no grease spots on car or cushions. The specialized lubricants come to you in clean, trade-marked cartridges. The lubricant stays in the cartridge until forced into the fitting.

For thousands of dealers, Cartridge Lubrication has written a new chapter of progress—more customers, increased sale of all products and services, greater profits. You owe it to yourself to investigate.

Standix
CARTRIDGE LUBRICATION

THE LUBRICATION CORPORATION

910 S. Michigan Avenue, Chicago

Tell me more about Standix Cartridge Lubrication.

Name.....

Address.....

City..... State.....

Do It Right! Get Results!

With STA-PUT Tools!

Give your rings a chance, chamfered pistons make them oil-sealed scrapers. No lathe necessary, a minute's job with STA-PUT Land Tool.

Cut those noisy interfering ring-lands back for insured clearance with STA-PUT Land Tool so they cannot freeze and stop proper ring action.

Expanders and rings must have clearance for action in order to follow the cylinder wall and not go dead. Clean or deepen properly with STA-PUT Ring Groove Tool.

STA-PUT Tools hold to constant cutting position and do not gouge or jump out of grooves. Precision milled cutters, hardened and ground, re-sharpened same as lathe tool.

Price: \$2.00 each or \$4.00 per set delivered.

Sold by Parts and Ring Distributors Manufactured by

CHARLES D. STROMGREN COMPANY
935-939 West 12th St. Los Angeles, Calif.
(If your jobber does not carry, order direct)

Wears like a solid block! Yet flexible enough for an easy installation job!

Here's the flexible molded lining. It's tougher than ever, yet free from all grit and "hard" spots. It does a real job, saves installation time and labor, and lets you put the dollars in the cash drawer. See your jobber, or write direct to

HOOSIER BRAKE LINING CORPORATION
North Manchester, Indiana
HOOSIER
F-L-E-X-I-B-L-E MOLDED
BRAKE LINING



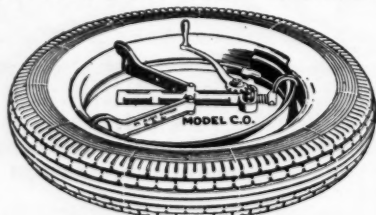
Flint Loss-Proof
Compression
SPARK PLUG!

The favorite replacement plug with leading garage and service stations because it produces a maximum power not only in the older type of motors but also in the latest type of high-speed, high compression motors.

Order from your jobber!
Write for literature!

C. V. S. Manufacturing Co.
Flint, Michigan

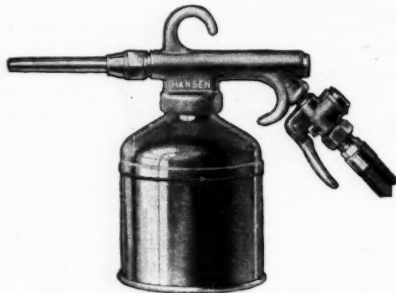
HERCULES TIRE TOOLS



BEST ON THE MARKET
They Always Do the Work
Benton Harbor Malleable Industries
Benton Harbor, Michigan

Hansen Sand Blast Cleaner Removes Paint

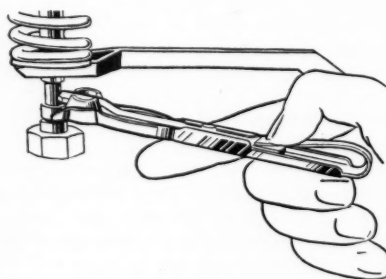
A new sand blast cleaner for removing old paint, rust, carbon, etc., is now being marketed by the Hansen Mfg. Co., Cleveland, Ohio. The sand blast gun is used in combination with



the standard Hansen air gun, tapered fittings being provided to make a tight connection. The body of the gun is made of aluminum alloy and is equipped with a hardened nozzle easily removable for inspection or wear. The heavily plated metal container has a capacity of one quart, equivalent to about 3 lb. of silica sand. An air pressure of 100 lb. or more is recommended. The No. 37 cleaner outfit sells for \$6.

Inserts Valve Keepers

The Klever Klip valve keeper inserter is designed to insert valve keys in any automobile or truck engine that



uses split or two-piece type valve keys. A positive stop is said to eliminate the possibility of inserting keys too far and permits the adjustment of keys where necessary. Manufactured by Aircraft Specialties, Inc., Lapeer, Mich., this tool sells for 75c.

Bendix Safety Meeting

Frank B. Willis, vice-president in charge of sales of The Bendix Products Corp., made public plans for the Bendix Highway Safety convention to be staged at South Bend, Ind., May 25-28. It is expected that 500 representatives of some 30,000 automotive service men in all parts of America will attend the convention.

The convention will be particularly unique in that those of the 30,000 men in the Bendix nationwide service organization who are unable to attend the convention will receive practically as many benefits from the conference as those attending in person.



Ask for money-saving prices on this high quality equipment. 30 Days' Trial without obligation will convince you of its profit possibilities—liberal terms lets the equipment "pay-for-itself" out of extra business profits. Check the items you're interested in and mail this ad with your letterhead for complete details on these profit makers.

☐ Upright Air Compressor ☐ 8-Hr. Battery Charger
☐ Hi-Pressure Car Washer ☐ Test Bench ☐ Portable Paint Spray ☐ "Simplified Arc Welding"

HOBART BROS., Box MA-46, TROY, OHIO

When Tuning up Cars this Spring, get the RIGHT TONE from your CASH REGISTER by selling.



LION CLEARWAY WIPER BLADES

Quicker Sale—Larger Profits—
More Satisfied Customers

LION PRODUCTS COMPANY

LYNN, MASSACHUSETTS, U. S. A.

WOODWORTH SPECIALTIES CO.
BINGHAMTON, N. Y.

NO STOOPING to Work THIS Jack!
and—it's Ball Bearing

Here's a honey for quick, clean hoisting. Lifts any car in a flash by the bumper braces. Genuine ball thrust bearing! Cadmium-plated steel screw! Rubber handle grip! Unbreakable rubber-set base! It's quality—and class! Shop size—for you, and for resale to lift big cars, only \$4.50 (list). Standard size (\$3.50 lbs. cars) \$3.50 list. Fine profit. Display one and see how it sells!

Now Any Garage Can Balance a Wheel!



**L & H Adjustable
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The only weights that are removable for readjusting when tires are changed—also to offset uneven wear. Never get loose on wheel. Easiest to install. Sold by leading jobbers. Investigate!

HARLEY C. LONEY CO.
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360,000,000 CAR RATTLES

are waiting for you to cash in on them—Here's how!

Slip a Universal between the window guide and window reveal—between hood and fabric strip. That ends the rattle permanently. No need to remove upholstery... no tools required. Tough prongs hold them firmly in place. 1,000,000 car owners would gladly pay \$1 per rattle to get rid of rattles.



UNIVERSAL

Rattle Arrestors
silence hood, and window glass rattles permanently.

Universals sell at a dime over the counter; 15c to 25c installed. They cost you \$2.85 for 50; \$1.50 for 25—10 for 70c. Sample free if requested on business stationery. Order now and start cashing the rattles.

UNIVERSAL ARRESTOR COMPANY
310 E. Wisconsin Ave., Milwaukee, Wis.

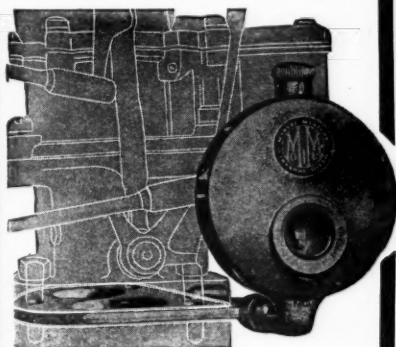
MARVEL MYSTERY OIL

For the upper portion of the engine, Marvel Mystery Oil is required because high temperatures not only destroy the lubricating value of ordinary motor oils, but reduce them to a residue of an objectionable nature. When Marvel Mystery Oil is added the residue is a lubricant.

Lubricates valves, pistons, piston rings and upper cylinder walls.

In the light of recent developments in Bearing Metals, it is important to note that MARVEL MYSTERY OIL IS GUARANTEED not to corrode or attack any metal or alloy.

Recommend its use, which insures you steady repeat business.



MARVEL MYSTERY INVERSE OILER For Top Cylinder Lubrication

Model O-C

Intake Manifold Installation

Special for Ford V-8, 1934-5-6

Reservoir—One Quart Capacity

List Price—\$4.75 Complete

Quickly and easily installed under-the-hood.

Automatically controls the flow of oil in direct proportion to the motor load—feeding fast on hills and at high speed, and stopping as the throttle closes.

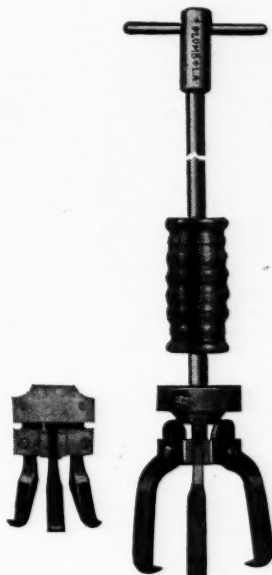
This installation produces more power, speed and mileage; cuts down motor wear, keeps valves in good condition and reduces carbon deposits.

Order through your Jobber and Specify Name and Model of Car or Truck.

EMEROL MFG. CO., INC.
242 West 69th St., New York City

Gear Pulling Made Easy With New Plomb Puller

The new Plomb universal puller is said to be a new application of the slide hammer principle to a puller for gears, bearings, bearing races, inside



bearing cups, valves, clevis pins, etc. The jaws are hooked in place, either inside or outside, and the adjusting nut is run down until it locks, after which a few blows of the 2½-lb. hammer are said to be sufficient to loosen the part. The outside pulling range is from zero to 3 in., while the inside range is from 1¼ to 2¼ in. The adjusting nut is reversed as shown when changing from inside to outside pulling. This puller is a product of the Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles.

Diesel Text Book

With Diesel engines coming more and more into prominence in the automotive field, many readers will be interested in "Elements of Diesel Engineering," by Orville Adams. It is a new text book, suitable for class room or home study use, covering the principles of Diesel operation, fuel injection systems and field maintenance of automotive Diesel engines. Price \$4. Published by the Norman W. Henley Publishing Company, New York City.

"Acres of Diamonds"

New trends in merchandising are seen in the tie-in of "Acres of Diamonds" with selling of visible record equipment, in the current advertising and merchandising program of Acme Card System Company, Chicago, Ill. This company offers, with its compliments, in its current advertising, a copy of "Acres of Diamonds" in its original book form, as originally delivered in lectures by Russel H. Conwell.

KREGER

GOOD PRODUCTS

Nos. 320-320-T Bell Housing Support

For all Chevrolet cars and trucks. Supplies uniform spring tension on the drive shaft, correcting wear and eliminating vibration—stops further wear. No. 320 for Chevrolet passenger cars, list \$1.00. No. 320-T for Chevrolet trucks, list \$1.50.

No. 205 Battery Hold Down

For V-8 Fords, 1933-36. Duplicates part No. 40-5165A. Another Kreger guaranteed product that means extra profit. List 30c.

No. 317 Fuel Pump Repair Kit

For late model Ford, Chevrolet, Hudson, Studebaker, Pontiac, and others. Contains universal diaphragm assembly, 2 springs, 2 large valves, and 1 gasket. List 60c. Others at 50c and 30c.

No. 216 Shock Absorber Links

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Financing Plans Discussed By Tenn. Maintenance Official

When a fellow has repair work done on a car he should be able to have the job financed as easily as when he buys a new car or a home, believes Dewey Wylie, president of the Tennessee Automotive Maintenance Association. He is trying to work out a plan with finance corporations.

Wylie is owner of Wylie Auto Co. in Knoxville, Tenn. He is also vice-president of the Knoxville Automotive Maintenance Association.

"Say a man wanted to have \$50 worth of work done on his car," explained Wylie. "Under the plan considered, I would call up a finance corporation, no one in particular, except that it would be one which had agreed to cooperate with us. If that corporation would be willing to take the customer's paper, then arrangements would be made for the customer to pay the corporation on a weekly basis.

"That would put it on a business basis. There is no reason why repair men should finance work themselves over a long time. It often costs them a good deal to collect."

Mr. Wylie said that members of the Knoxville association have discussed the proposal.

"We have a credit pool," said Mr. Wylie. "We found that about \$7,000 is owed by around 100 people. Some people would try to get all the work they could from one repair shop on credit and then try another. They were just the same people, trying to gyp all of us.

"So we formed our credit pool and now we exchange information on our customers. It keeps down losses."

There are 40 members in the Knoxville association. They have an emblem which they display, assuring customers of a high standard of work. No shop which could not meet qualifications is admitted to membership.

They are in a movement for a safety inspection lane in Knoxville. Memphis has one and it has been inspected by Knoxville city officials with a view to a similar one.

Fosberg Screw Driver

Detects Faulty Plugs

The Fosberg Manufacturing Co., Bridgeport, Conn., is marketing a line of spark-testing screw drivers. There is secured in the handle a neon tube, visible through a milled slot, and when the tip of the screw driver is placed on a firing spark plug this tube flashes an orange light. The regularity and brightness of the flashes indicate to the mechanic the condition of the plug being tested. This screw driver is made in three styles, the first having a black Pyraloid handle with a 3/16-in. blade 4 in. long. The second style has the same size blade, but a hardwood handle. The third style has a magnetized blade 1/8 in. in diameter and 2 1/4 in. long. The black Pyraloid handle has a pocket clip, and a guard is furnished for the blade tip. The neon tube is easily replaceable in case of damage.

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Insist on —

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"Measurably Better"
SPRINGS

You and Your Customers Can
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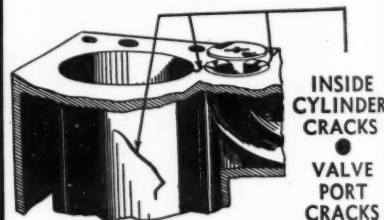
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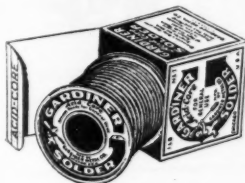
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New Merchandising Plan Increases Dealers Patch Sales and Tire Repairs.

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Don't lose patch sales to chain stores

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INCREASE YOUR SALES MAKE MORE MONEY

Ask Your Jobber or Write the Manufacturer

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Nothing takes the place of a **VULCANIZED Tube Repair**



Here's the **FASTEST** and finest fully automatic electric tube plate. Vulcanizes **RUBBER VALVE STEMS**. No heat surge. Price only \$10.00. Ask your jobber or write for circular.

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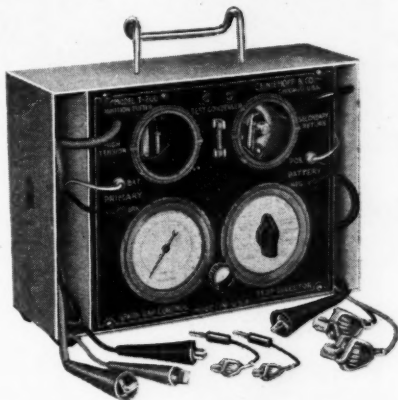
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Niehoff Ignition Tester Is Portable Equipment

In making tests on a car with the T-200 Niehoff portable ignition tester no external source of power is required, as it is only necessary to clip the two leads on the starter cable and



the ground. This instrument can be used for testing coils on or off the car, likewise for condensers, cables, rotors, caps, spark plugs, etc. A multi-position switch controls all operations and simplifies the different tests. In testing the coil an adjustable spark gap is used which is controlled by a micrometer gear adjustment with readings indicated on an airplane dial having a scale length of six inches. Indication of a miss in the spark is accentuated by a break in the glow of a Geissler tube mounted along side the two electrodes. C. E. Niehoff & Co., makers of this tester, are located at 230 West Superior St., Chicago, Ill.

Announce Special Tool For Body Maintenance

A tool for working on the door hinges of Fords and other cars has been announced by the Apco Mossberg Corp., Attleboro, Mass. One end is a special-shaped claw used to set the door close on the hinge mount, while the other end is fork-shaped to be used on long hinges.



HEXSET TAPS and DIES



11 Taps, 11 Dies, Sizes 1/8" to 1/2"; Die Stock; Tap Wrench; Set No. 77, \$7.50.

WHY HEX DIES?

Because that's the shape needed for your threading work.

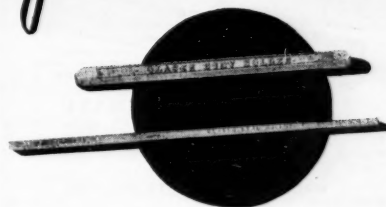
A quick snug fit in the Hex Die Stock.

In close quarters on the car you can use them with an end wrench or socket wrench. Write for the Rimac catalog—Full of tools designed especially for you.

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Send for Your Copy!

New 48-page illustrated "AUTOMOTIVE CLEANING HANDBOOK" shows how others Clean Floors, Wash Cars, Trucks and Buses, Strip Paint, Clean Motors, and other similar operations, saving time, turning out better work at lower cost.

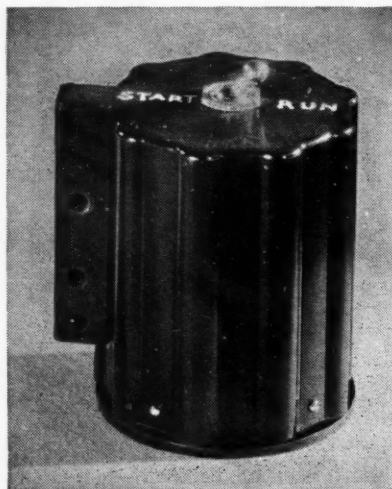
MAGNUS CHEMICAL CO., INC.
174 South Avenue Garwood, N. J.



Mail this ad with your business letterhead, and a free copy will be sent you.

Sparkflo Aids Starting With Sluggish Motors

Sparkflo is a new automotive device developed to start sluggish motors quickly in cold weather. The unit, in



a Bakelite case, can be mounted on the steering column or instrument board, and sends an extra shower of sparks into the combustion chamber of the motor. After the motor is started the toggle switch on top of the case is thrown from the "start" to the "run" position. Sparkflo is a product of Guaranteed Parts Co., Inc., 250 West 54th St., New York City.

Visit West Coast

Ralph R. Teetor, in charge of engineering, Perfect Circle Co., and president of the Society of Automotive Engineers, and John A. C. Warner, general manager of the S.A.E., will visit the Pacific Coast.

Mr. Teetor spoke on "Keeping the Automotive Industry Young" at meetings of the Northwest Section at Seattle, March 24, the Oregon Section at Portland, March 26 and the northern California Section at San Francisco, March 31. Mr. Warner also spoke at these meetings.

May Be Seagoing Highway

County Commissioners of Key West, Fla., have voted to seek purchase of the right of way for an overseas motor highway, as they have abandoned hope of seeing trains running again over "the railroad that goes to sea."

Pittsburgh Trade Show

The Pittsburgh Automotive Maintenance Industries Show, March 11 to 14, broke all previous attendance records with a total maintenance trade attendance of 6,444 during the four days, according to George A. Ley, secretary of Automotive Maintenance Industries, Inc., and manager of the show.

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that control
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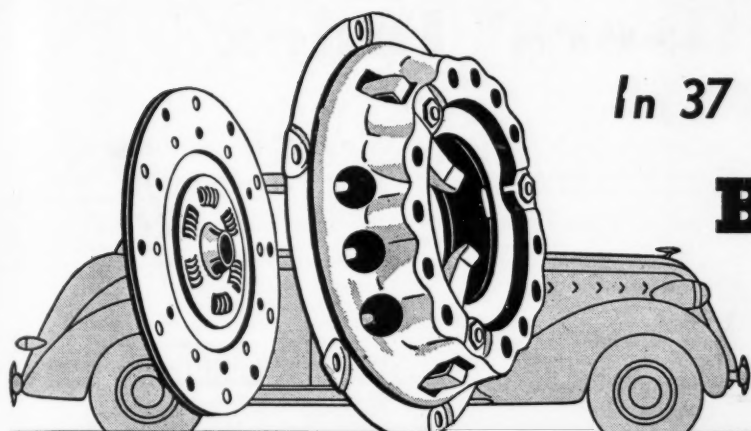
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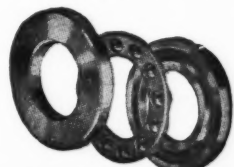
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Motorists to Take Motor Tax Issues to Polls

Recent legislative developments indicate that excessive taxation and restriction of the use of motor vehicles will be prominent issues during the election campaigns in most states this fall, a recent report of the American Petroleum Institute stated.

President Thomas P. Henry of the American Automobile Association has called upon the organization's 800 local motor clubs and state organizations to function as mobilization centers for clarifying motor tax issues and to pledge candidates for office against gasoline tax increases and against diversion of highway funds. He made it clear that the activities of the association will be entirely non-partisan.

Encouraged by the popularity of efforts to reduce gasoline tax rates in New York, Kentucky, Mississippi, Indiana and Massachusetts, and by the unpopularity of an attempt to increase Virginia's gas tax rate, candidates for important state and national offices, and candidates for the legislatures and for Congress are placing gasoline tax reduction planks in their campaign platforms, the report said.

Van Auken-Ragland Moving

To provide more spacious facilities, which better meet the requirements of their business and its continuous expansion, Van Auken-Ragland, Inc., advertising agency, will move into larger quarters on May 1st in the Twenty North Wacker Building, known also as the Civic Opera Building, Chicago.

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